

103
**THE CLINTON ADMINISTRATION'S TECHNOLOGY
POLICY AND THE ROLE OF SMALL BUSINESS**

Y 4. SM 1:103-11

The Clinton Administration's Techno...

HEARING
BEFORE THE
COMMITTEE ON SMALL BUSINESS
HOUSE OF REPRESENTATIVES
ONE HUNDRED THIRD CONGRESS

FIRST SESSION

WASHINGTON, DC, MAY 13, 1993

Printed for the use of the Committee on Small Business

Serial No. 103-11



DEC 13 1993

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1993

68-059--

For sale by the U.S. Government Printing Office
Superintendent of Documents, Congressional Sales Office, Washington, DC 20402

ISBN 0-16-041567-5

103
**THE CLINTON ADMINISTRATION'S TECHNOLOGY
POLICY AND THE ROLE OF SMALL BUSINESS**

Y 4. SM 1:103-11

The Clinton Administration's Techno...

HEARING
BEFORE THE
COMMITTEE ON SMALL BUSINESS
HOUSE OF REPRESENTATIVES
ONE HUNDRED THIRD CONGRESS
FIRST SESSION

WASHINGTON, DC, MAY 13, 1993

Printed for the use of the Committee on Small Business

Serial No. 103-11



DEC 13 1993

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1993

68-059-2

For sale by the U.S. Government Printing Office
Superintendent of Documents, Congressional Sales Office, Washington, DC 20402
ISBN 0-16-041567-5

COMMITTEE ON SMALL BUSINESS

JOHN J. LaFALCE, New York, *Chairman*

NEAL SMITH, Iowa
IKE SKELTON, Missouri
ROMANO L. MAZZOLI, Kentucky
RON WYDEN, Oregon
NORMAN SISISKY, Virginia
JOHN CONYERS, JR., Michigan
JAMES H. BILBRAY, Nevada
KWEISI MFUME, Maryland
FLOYD H. FLAKE, New York
BILL SARPALIUS, Texas
GLENN POSHARD, Illinois
EVA M. CLAYTON, North Carolina
MARTIN T. MEEHAN, Massachusetts
PAT DANNER, Missouri
TED STRICKLAND, Ohio
NYDIA M. VELAZQUEZ, New York
CLEO FIELDS, Louisiana
MARJORIE MARGOLIES-MEZVINSKY,
 Pennsylvania
WALTER R. TUCKER III, California
RON KLINK, Pennsylvania
LUCILLE ROYBAL-ALLARD, California
EARL F. HILLIARD, Alabama
H. MARTIN LANCASTER, North Carolina
THOMAS H. ANDREWS, Maine
MAXINE WATERS, California

JAN MEYERS, Kansas
LARRY COMBEST, Texas
RICHARD H. BAKER, Louisiana
JOEL HEFLEY, Colorado
RONALD K. MACHTLEY, Rhode Island
JIM RAMSTAD, Minnesota
SAM JOHNSON, Texas
WILLIAM H. ZELIFF, JR., New Hampshire
MICHAEL A. "MAC" COLLINS, Georgia
SCOTT McINNIS, Colorado
MICHAEL HUFFINGTON, California
JAMES M. TALENT, Missouri
JOE KNOLLENBERG, Michigan
JAY DICKEY, Arkansas
JAY KIM, California
DONALD A. MANZULLO, Illinois
PETER G. TORKILDSEN, Massachusetts

JEANNE M. ROSLANOWICK, *Staff Director*
STEPHEN P. LYNCH, *Minority Staff Director*

CONTENTS

Hearing held on May 13, 1993.....	Page 1
WITNESS	
THURSDAY, MAY 13, 1993	
Gibbons, John H., Director, Office of Science and Technology Policy	6
APPENDIX	
Gibbons, John H., prepared statement and information requested by Chairman LaFalce.....	41
Opening statements:	
Combest, Hon. Larry.....	29
LaFalce, Hon. John J.	24
Lloyd, Hon. Marilyn	39
Machtley, Hon. Ronald K.	38
Meyers, Hon. Jan	27
Poshard, Hon. Glenn	35
Ramstad, Hon. Jim	31
“What Silicon Valley Needs From Clinton,” article from Wall Street Journal, submitted by Mr. Ramstad.....	33

THE CLINTON ADMINISTRATION'S TECHNOLOGY POLICY AND THE ROLE OF SMALL BUSINESS

THURSDAY, MAY 13, 1993

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SMALL BUSINESS,
Washington, DC.

The committee met, pursuant to notice, at 10:30 a.m., in room 2359-A, Rayburn House Office Building, Hon. John J. LaFalce (chairman of the committee) presiding.

Chairman LAFALCE. The Small Business Committee will come to order.

It gives me great pleasure to welcome Dr. Jack Gibbons, the President's Science and Technology Adviser to our committee. For the first time in recent memory, this country has a President and an administration that is committed to a comprehensive technology policy, that believes Government can and should play a key role in stimulating technological advance, and that recognizes the importance of small companies in technology, innovation, and job growth.

I have great respect for Dr. Gibbons. It was Dr. Gibbons' leadership over the past decade as head of the Office of Technology Assessment that made the Office of Technology Assessment into the effective and respected organization that it is today.

In 1984, when I chaired the Banking Subcommittee on Economic Stabilization, I worked closely with OTA on the Advanced Technology Foundation bill, H.R. 4361, which would have supported research on generic technologies with commercial application and would have established a Federal Industrial Extension Service. OTA reported that the Advanced Technology Foundation "could be a major step in deepening and broadening the technological foundations for U.S. industry."

I would like to believe that our work with OTA on this concept a decade ago may have helped to lay the foundation for some of the proposals under discussion today, including the administration's proposal to create a national network of manufacturing extension centers and to expand Federal funding for precompetitive R&D projects with commercial relevance.

Technology is a critical policy area. Studies conducted over the past 30 years show that technological advance is the single most important influence on productivity growth, accounting for roughly 50 percent of the growth in GNP per person employed during this century. If this administration can design policies to effectively

spur technological advance, we will be a long way toward realizing the central goal of this administration: Increasing the long-term growth rate of the American economy.

I want to open the hearing, though, by drawing attention to a very important, and little noticed, development in the American economy. We have all heard about the retrenchment of large technology companies like IBM and United Technologies. What is not widely recognized is that small high-technology companies have been growing at an extraordinary rate, transforming the high-technology sector of the economy, and making an increasingly significant contribution to technological advance.

By almost any measure, high-technology small businesses have been the star performers in the U.S. economy in recent years. They have been the fastest-growing segment of the U.S. economy by far, with employment expanding more than two and a half times as fast as job growth in the overall economy and more than twice as fast as job growth in either the high-technology sector or small business sector generally.

Over the past decade, small business' share of the Nation's scientists and engineers engaged in R&D has increased by approximately 150 percent.

Perhaps the best explanation for this remarkable surge is that the market recognizes the innovative advantages of small businesses. Careful empirical studies show, for example, that small companies contribute on average more than twice as many innovations per employee as larger companies. Small companies also contribute a disproportionately large share of the most significant innovations, including such notable examples as the small computer, the super computer, the planar integrated circuit, and the Xerox copier. Through the small business innovation research program, small companies have shown that they are on average significantly more effective than other Federal contractors at converting Federal research dollars into commercial technologies, as documented in recent GAO studies.

Let me pass over the rest of my opening statement saying, Dr. Gibbons, I am looking forward to your testimony, and I am looking forward to working closely with you in your new position.

[Chairman LaFalce's statement may be found in the appendix.]

Chairman LAFALCE. Before we call upon you I want to ask other members of the committee if they have any statement.

Mr. Ramstad.

Mr. RAMSTAD. Thank you, Mr. Chairman.

Dr. Gibbons, welcome to the committee.

I ask in their absence that Mrs. Meyers' and Mr. Combest's statement be made a part of the record.

Chairman LAFALCE. Without objection, so ordered.

Mr. RAMSTAD. Thank you, Mr. Chairman.

[Mrs. Meyers' and Mr. Combest's statement may be found in the appendix.]

Mr. RAMSTAD. Mr. Chairman, I, too, am pleased to have Dr. Gibbons with us this morning to discuss one of the most important issues facing the economy—the development and marketing of technology.

I am extremely concerned that today's high tax and regulatory environment is making it very difficult for the technology-driven companies in our country to continue to be innovative, and I am literally alarmed at the lost jobs and technology going offshore in the biomedical industry.

I represent Medical Alley in Minnesota, 500 biomedical companies like Medtronic. I see what is happening there, and I would certainly like to get into this later following your testimony.

You probably read the Harvard Business Review article of about a year ago concerning the exodus of jobs in the biomedical community because of overregulation and high taxation. The article compared the biomedical industry to what happened several years ago in the electronics industry, and we all know what has happened to the country in terms of the electronics industry.

I also read with great interest the administration's publication "Technology for America's Economic Growth, A New Direction to Build Economic Strength." I applaud the President and you, Dr. Gibbons, for your recognition of the importance of technology to the economy.

But I must say that I have fundamental reservations about the Government-directed, Government-funded industrial policies that are outlined in this treatise. I believe that private capital, not taxpayer money, is the appropriate financing mechanism for research, development, and marketing of new technologies. Individuals and businesses, not bureaucrats and politicians, with all due respect to all of us, are best equipped to make these basic investment decisions affecting such technology.

That is why the technology policy I support differs from the administration proposal to put Government in charge of innovation. I feel above all that we must address the fundamental problems facing our high-technology companies, namely, overregulation and overtaxation.

I also read, as I'm sure you did, the Wall Street Journal article last month written by T.J. Rodgers, an entrepreneur who built Cypress Semiconductor from a one-computer company to a corporation that has, in only 10 years, generated over \$1 billion in cumulative revenue, more than \$160 million in profits, on which it paid \$60 million in taxes, created 1,500 jobs, and paid salaries of nearly \$500 million.

This column was entitled—and I ask, Mr. Chairman, unanimous consent that this article also be included in the record—"What Silicon Valley Needs from Clinton." and this questions the President's call for subsidizing high-technology companies. Instead, Mr. Rodgers urges the President to improve the financial infrastructure by increasing the supply of capital by reducing Federal spending and decreasing the capital gains tax, not by creating Government-funded research programs.

[The article may be found in the appendix.]

Mr. RAMSTAD. I also refer to a Murray Weidenbaum article in the Harvard Business Review of a year ago. He wrote,

The availability of capital to develop technology is another crucial element. During the 1970's and early 1980's, venture capital fueled entire new industries such as semiconductors and biotechnology. Over the past 5 years venture funding has steadily declined.

Mr. RAMSTAD. As we all know, the pool of venture capital in this country has diminished to less than \$1 billion. We all also know that the capital gains tax rate was reduced in 1978 and then raised again in the 1986 Reform Act.

There should be no question that the direct correlation between the availability of capital and the taxes that were imposed by capital gains is inescapable.

The other main issue facing high-technology companies is excessive Government regulation. As I mentioned, the perfect example of overregulation involves some of the Medical Alley companies in my district of the Twin Cities. I visit these plants, these companies, Medical Alley, on a regular basis.

Medtronic, which I mentioned, developed the first wearable external cardiac pacemaker back in 1957 and manufactured the first reliable, implantable pacing system in 1960. Medtronic has been the world's leading producer of pacing technology. I know the founder, Earl Bakken. He has told me and the world in various articles that in today's regulatory environment, he couldn't even start Medtronic. He could not build that company, plain and simple. He cites overregulation above all other problems.

Other biomedical companies have told me chilling stories about the bureaucratic hoops they have been made to jump through to get approval from the FDA for their products. Just recently, Minntech had horror stories in which the FDA was supposed to review their proposals within 90 days, but after a year, they are still waiting for an answer.

We all know the horror stories of these regulations, and I certainly hope that a large part of your thrust, Dr. Gibbons, is to help us reduce these regulations.

Let me close by saying that I, too, am looking forward to your testimony today. I know you are generally interested in stimulating technological development, and I welcome the opportunity to dialog with you and find out exactly what the administration is planning to do to maintain a vital and growing technological sector of our economy.

Thank you, Mr. Chairman.

Chairman LAFALCE. Thank you very much, Mr. Ramstad.

[Mr. Ramstad's statement may be found in the appendix.]

Chairman LAFALCE. I think both President Clinton and Dr. Gibbons must have been aware of your comments before because in President Clinton's speech yesterday swearing in the new head of the SBA, Erskine Bowles, he said he was charging him with four specific responsibilities, and he borrowed heavily from your thoughts about the importance of capital, even in the small business community.

He specifically mentioned changes in the banking regulations and in the capital gains tax cut that he has proposed for small businesses, and, second, in getting the paperwork burden off the back of the small business community. These are two of the major charges that he has given Mr. Bowles.

I am pleased that Dr. Gibbons, too, although he is here today to discuss technology policy, points out in his statement that you can't really get to the technology policy without dealing with the capital

problem and the paperwork problem first. So, there is a symmetry of thinking in large part. There are a few differences.

Does anybody else have any opening statement they wish to make? We will adopt the rule ladies first rather than seniority first.

Mr. FLAKE. I will agree to that, Mr. Chairman, by unanimous consent.

Ms. MARGOLIES-MEZVINSKY. Thank you, Mr. Chairman.

More specifically, thank you, Mr. Chairman, for rounding out Small Business Week with a hearing on our Government's science and technology policy, a fitting subject since I believe it represents our Nation's economic future.

I applaud the Clinton administration's commitment to working with private industry to develop new technologies. This private-public partnership will allow our Nation to recapture the lead in new manufacturing techniques, semiconductors, biotechnology, and similar technologies of the future.

Small businesses must have the same access to Government research funds and support as do large businesses. Small companies have been responsible for much of our country's past technology development. One need only think of Apple Computer which started in one man's garage and has since revolutionized the computer industry to recognize the truth of the statement. We must ensure that the future holds the same promise for both small and large businesses, and I look forward to Dr. Gibbons testimony today, and I thank you once again, Mr. Chairman.

Chairman LaFALCE. Thank you.

Representative Flake.

Mr. FLAKE. Thank you very much, Mr. Chairman, for these three hearings which you have conducted this week which has been proclaimed Small Business Week. Specifically, you concentrated on the President's economic program as well as difficulties facing small business owners. Thank you, as Chairman, for your commitment in these areas. As you know, through our work together for 6 years on this committee and the Banking Committee these areas are of great concern to me.

It is appropriate that these hearings are conducted consecutively so that we can gauge the effectiveness of the President's program and its possible consequences for real small business owners. The amalgam of small business owners and presidential advisers who have come before the committee, allow us the opportunity to more adequately assess the needs of small businesses. Moreover, these hearings have assisted in illuminating how the President's proposal can help to meet those needs. Additionally, it is my hope that the witnesses who have come before us today can help us in strengthening the overall segment of American small business.

We cannot afford to be short-sighted in our efforts to move progressively toward an agenda that allows America to be its best, to do its best, and to produce its best.

Therefore, I believe that it is incumbent upon the committee and the administration to consider all available options and the possible ramifications of our decisions. We must put aside partisan politics and deal with the reality that our decisions have an impact on those persons who are doing business in this country.

As one panel member noted during yesterday's hearing, we must be cognizant of the fact that there are a myriad of reasons why small businesses are faltering. There is no one panacea for ameliorating the ills facing small businesses.

With that in mind, I believe that these hearings will be instrumental in helping us to unveil the problems facing the small business community and how we can move toward some solutions. Therefore, I welcome today's witnesses who will testify on the administration's new technological initiatives.

Thank you very much. I yield back, Mr. Chairman.

Chairman LAFALCE. Thank you very much.

Chairman LAFALCE. Well, Dr. Gibbons, finally, you are on. What we will do, if there is no objection, is put the entire statement of Dr. Gibbons in the record at this point and ask him to summarize it.

TESTIMONY OF JOHN H. GIBBONS, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Dr. GIBBONS. Thank you, Mr. Chairman, members of the committee.

I am delighted to be before you this morning. I appreciate your kind words and remembrances of the OTA work in this area. It certainly helped frame my feelings about the matter. I believe that as we look back nearly a decade now on that work, it stands the test of time, so I am pleased to have that as part of my background.

Chairman LAFALCE. Do you often wonder about the jobs we could have saved, the industries we could have saved, had we not lost a decade?

Dr. GIBBONS. I also want to confess to you this morning something I think that is important for the committee to know: Namely, that in my past—it has been a number of years now—but in my past I have been a principal in the startup of six small businesses, three of them in manufacturing high technology, two of those were spin-outs of a national laboratory, and one was separate. Two of them are still in business, which is a pretty good average, as you know. Those experiences have strongly flavored my own perspective and feelings about these things.

All three of my daughters had small businesses. One of them, Mr. Ramstad, is in surgical instruments manufacturing and sales, and she has some of the same frustrations you just reiterated a few minutes ago. So, I am keenly aware of the opportunities we have, through public participation and through Government, for making the small business climate better than it has been in the past through a variety of mechanisms. I would like to speak to some of those this morning.

There is no need reminding you people that the small businesses really create most of the new jobs in our economy. Some people say that small business creates more than 100 percent of the new jobs, especially in manufacturing, because there are losses in large businesses that have to be made up in small business even before one adds jobs. So, it is a terribly important part of our economy; half of our GNP, half of our sales, and half of our people.

Of course, technology policy is just one piece of the President's overall economic plan that was released in February to which you referred. The plan includes a number of proposals that are designed to strengthen American companies. We have given special emphasis to small companies in no small part because we know that this is the origin of new jobs in our economy. Regardless of how well our Nation is doing in terms of the bottom lines of our corporations, if we don't also see jobs created, then we have had an incomplete measure of how well our economy is doing.

The plan addresses a number of key concerns of American business. It does address the issue of capital formation and, specifically, capital formation for small businesses, that critical time in a corporation's life. It addresses work force skills, health care, trade, Government regulation, and technology, as well as the infrastructure on which all business depends so much.

In my written remarks, I try to summarize the efforts in all of these areas, but I know we don't have time to cover all of them this morning, so I would like to focus on the technology policy if I may.

In the paper we released in San Jose on February 22 entitled "Technology for America's Economic Growth," we provide a comprehensive strategy for using technology to meet a number of national goals.

This so-called technology initiative relates to three goals. The first is a series of actions to create long-term economic growth that both creates jobs as well as wealth, and at the same time protects environment. I will elaborate on this goal in just a moment.

The second goal is to help evolve a Government that is more productive, more efficient, more user friendly, more responsive to the needs of its clients, namely the American people and institutions. As you know, Vice President Gore is working on this under the general rubric of reinventing Government, and we can return to this in a few moments.

The third goal is to provide sustained support, whatever is requisite, for the United States to maintain world-class education, providing leadership not only in basic science but in mathematics, engineering, and in our human resources. We know this is universally supported, but we feel that it must be given careful attention or we can slip further, as we have slipped in the past years.

We also believe, Mr. Chairman, that small business has important things to contribute in all three of these areas. But I believe it is in this first area, sustaining economic growth, that I would like to focus on this morning, and the programs that we believe will help specifically in that particular area.

We put emphasis on technology as a catalyst for economic growth. We do believe technology, if appropriately applied, can be one of the most fundamental engines for growth in our economy. We place heavy emphasis on technology as a catalyst by giving direct support to the development, commercialization, and the deployment of certain new technologies and by providing fiscal and regulatory policies that promote such activities, however indirectly. Mr. Ramstad pointed out earlier this morning, the technology plan provides a mechanism for improving what I would call the fertility of the seed ground for private investment, entrepreneurship, risk

taking, and innovation. We know that seed ground is strongly affected by Federal policies.

We want to also help provide an investment in education and training. Our work force, in order to compete with our global competitors, must generate the kind of productivity and efficiency that is requisite to keep these jobs from moving overseas. Finally, we want to provide support for critical infrastructure improvements, not only in terms of our traditional transportation but, in particular, providing a more effective information system in our Nation that enables better access to, and transfer of, information between parties of interest.

Let me then turn to this question of technology development, commercialization, and use. I think, as this committee knows full well, in the extent to which we've developed a kind of partnership between the public and private sector in technology development, we lie well behind, for example, where Japan and Germany do in this regard. Our focus here has certainly been on basic research and development, but, if you look at the numbers, it has been more on research and development as specifically tied to Federal agency missions, such as defense or space. Only indirectly have we tried to link that major investment into broader areas and opportunities in our economy.

Historically, we have looked for serendipitous spinoffs from R&D. For instance, in the defense area, we hope weapons research will spin out to potential application in the civilian area. In truth, many of the most important research and development products for defense have actually come from the other direction. They have come from the commercial side into the defense side.

So, the feeling is that we need more and more to encourage scientists and engineers in agency laboratories and in other Government research and development activities to think not just in terms of their mission needs; they must look for broader opportunities that their activities provide in our common search for a more vigorous basis for economic development.

We also feel that the ratio of the investment in our R&D system that has been so dominated by defense-oriented investment during the Cold War now needs to shift more than slightly. The ratio must move in a major way back to a greater concentration on the civil sector of our economy, which drives our productivity and our capability to compete economically in an increasingly competitive world.

You are quite familiar with the administration's programs designed to strengthen our industry/Government cooperation and to provide more Federal support for commercially relevant research and development. But I do want to reiterate them and the administration's support for them.

The Commerce Department's Advanced Technology Program is slated to expand from about \$68 million in fiscal year 1993 to almost \$750 million by fiscal year 1997. This program was created in 1990 by Congress. It provides competitive matching grants to companies working on so-called precompetitive or generic technology, and I think, importantly, is designed along ways that are quasi-market tested. That is, these programs move forward only when all the participants have money on the table. It is not a pure Federal

grant program but watches those areas where the interest is there and the money is on the table from all the participants in the activity.

The administration also supports the Technology Reinvestment Project which was created by Congress last year. It will provide over \$500 million to the ARPA at the Department of Defense, NASA, Commerce, Energy, and the National Science Foundation to fund innovative technology development projects at companies large or small throughout the country.

The TRP is part of our defense conversion activities. As you know, we have had meetings around the country in which all five of those agencies participated. The meetings were with potential partners in the private sector, and the turnout has been tremendous. We believe that program is going to bear good fruit in the coming years.

We also propose to expand the Small Business Innovation Research Program. I believe when Vice President Gore was a Member of the House, he played a role in helping create the SBIR Program, and I know personally that he continues to be a champion for it. Last fall, he and the President endorsed the doubling of the set-aside from 1.25 percent to 2.5 percent. Shortly before adjournment last fall, Congress passed and President Bush signed legislation for that purpose.

We feel that while it bears continuing analysis, evaluation, and feedback, it is clear that the program has been a real success, helping hundreds of small businesses throughout the country to take good ideas and turn them into technologies, products, and services.

The Small Business Technology Transfer Program, which I know is of particular interest to this committee, would augment the SBIR Program by targeting some small but important pilot studies that provide seed capital at a very fragile and important time when ideas are generated but have not found fruit yet in terms of a corporate setting and an activity. So, it could help nurture the very earliest stage of innovative business formation. This is a very interesting example of the kind of experiment we should be undertaking to see what we can do to help cross this gap between being a Nation that does excellent research but then, all too frequently, sees the results of that research flow to some other place around the globe for its transformation into manufacturing and the production of goods and services.

Now, of course, there are other areas, especially in small business life, that are critical. One is having access to specialized knowledge, not just access to patient capital which is critical, but also access to specialized knowledge. We propose to work with the States to extend the ability of small business to access specialized knowledge, for example, in advanced manufacturing techniques, design, and engineering techniques. That is part of this technology package.

As Mr. Ramstad pointed out, and as I believe Laura Tyson probably mentioned when she was before you, I believe last week—

Chairman LAFALCE. Tuesday of this week.

Dr. GIBBONS [CONTINUING]. Tuesday of this week, there are the fiscal and regulatory policies that can be modified and improved to promote innovation and private sector investment. These policies

improve the fertility of the seed ground. If one can improve that fertility, it means private capital, interest, and entrepreneurship are more readily drawn into this arena. We feel that is a terribly important ingredient of a technology initiative. It is an important enabling activity.

To that end, we strongly support making permanent the research and experimentation tax credit which enables corporations to make longer-term decisions about their research and experimentation activities rather than having to think only in terms of perhaps a year in advance. We firmly believe that it is important to create conditions that encourage patient capital. Patient capital enables people to make longer term decisions and to undertake the development of products that may take several years before they can reach market.

There are certainly recurring concerns about the lack of patient capital for investment, especially in high-technology industry. I think, partly in response to these concerns last year, Congress did pass legislation to restructure the SBIC Program, and we certainly support that particular direction.

There are a number of activities that I would only briefly refer to.

I know H.R. 820, the National Competitiveness Act, includes provisions for loan guarantees and a Federal Venture Capital Fund.

The National Academy of Sciences has recently proposed creating a public funded but privately run Civilian Technology Corp.

The Council on Competitiveness, headed by John Young, recently proposed a sweeping set of reforms that would encourage long-term capital investment by corporations.

So, there are a number of proposals that we are watching and are interested in that address this problem. They are being carefully considered now by a multiagency working group headed by our partner in the White House, the National Economic Council, and we are participating with them on this evaluation.

The third area I would mention is education and training. You know that many of our small businesses have difficulty because new employees coming out of high school or higher education are simply ill-equipped if not unequipped to handle the kinds of responsibilities that are needed. It is a major burden in the business sector to provide remedial education to enable these people to undertake highly productive work.

It is another area of partnership. We are encouraging strongly a public role in improving education, especially in math, science, and engineering, in K-12, which so strongly influences later life, but also in the school-to-work transition.

Finally, as you know, we are giving strong emphasis to the information infrastructure, which has some analogies to earlier times in world history when major new opportunities were undertaken by public and private sectors to enable new things to happen. One can make a comparison between the information infrastructure and our national transportation system or England's maritime system or Rome's road system.

It is very important in an area in which technology is moving so rapidly to make sure gains from this rapid motion are captured

here in the United States. We can't let our competitors get that far ahead of us.

So, we are giving strong attention to try, again, to provide the seed ground for private investment to move ahead with a wide-band, high-speed information network that is accessible for both public as well as private sector needs and opportunities, ranging all the way from use in education for rural schools to the use by small business for being able to create virtual corporations and do things such as my daughter is doing, incidentally. So, we are giving special emphasis to this, in part because it reflects a very rapidly moving technology that is going to improve our opportunities for the future.

In conclusion, Mr. Chairman, we do believe that the administration has a comprehensive and a proactive technology policy that can and will provide major benefits to American business with a special emphasis on small business. Nothing happens with lightning speed in this area. These are long-term programs, multiyear programs, but we believe they help build a firm foundation for the future that we want to be able to create for ourselves and our children.

I look forward to working with this committee in particular to ensure that our technology programs do respond to the needs of small business. Particularly in the area of technology, small business men and women have a key role to play in our Nation's economic future—in my own family's future, I would add. We are delighted to work with you in this very important area.

Thank you, Mr. Chairman.

Chairman LAFALCE. Thank you very much, Dr. Gibbons.

[Dr. Gibbons' statement may be found in the appendix.]

Chairman LAFALCE. I will defer my questions until the other Members have had an opportunity to ask theirs.

Mr. Flake.

Mr. FLAKE. I have one question for Dr. Gibbons.

You have discussed the necessity to improve our math and science programs, and I concur. Are there any specific proposals in place to determine the course we may want to take? I think it is a critical area and so many of our young people now lack basic educational skills. Therefore, I am concerned about the process by how do we move them toward an expansive involvement in math and science, because it demands so much more than most young people are getting from our current educational system.

Dr. GIBBONS. I am pleased to respond to that question. I think it goes to the heart of the issue here.

I am also pleased to tell you that we are developing under the so-called FCCSET process, which is the Federal Coordinating Council for Science, Engineering, and Technology, a strong math and science education initiative.

Chairman LAFALCE. Is this the one headed by Rubin's office?

Dr. GIBBONS. No; the FCCSET is headed by me as Director of OSTP. We do a lot of things between the National Economic Council and OSTP.

The FCCSET was created under the OSTP, and its mission is to try to help integrate and coordinate the executive agencies, all of which have a position, jurisdiction, and activities in one or another

area. In the case of education, it is a consortium of the Science Foundation, the Department of Education, the Department of Labor, and now also the Department of Defense.

What we are doing in that regard is, first of all, trying to give increased emphasis to the role that each of those departments play in their own separate places. Each have complementary roles to play, but we also are beefing up in the Department of Education, specifically, the capabilities in technology to take better advantage of advanced technologies in the classroom.

We are using the resources through the Department of Commerce to try to help fund opportunities in education to take fullest advantage of this new national information system. In other words, we are trying not so much to go out and lay fiber-optic cable, but we are trying to help start experiments that will end up being a demand pool for those services by helping teachers and students have better access to information technology.

We are trying to tap into an enormous body of experience, resources, capabilities that have been built up in the Department of Defense over the past decades that have previously really not been tapped into our educational system outside the department. This is both in formal education as well as in training for specific skills, simulation techniques, and the rest. DOD relies heavily on relatively sophisticated computers that are now getting cheap enough that one can use these in a variety of additional settings. So, there is a new kind of a relationship between the Defense Department on the one hand and Labor and Education and NSF on the other.

I was at a meeting at the Department of Commerce yesterday with people from the manufacturing sector, and I wish their trailer were in this room today. They use software on a computer to design something, and then the computer runs a machine that is next to it that actually manufactures the physical thing.

Then they move to the next station and inspect it for its quality performance and the like. School children, grades six, seven, and eight experience of the whole process of turning an idea with computer assistance into a physical thing and then understanding testing and other procedures that are all part of the manufacturing process.

This private sector organization chose the middle school years because this is when kids' minds are so flexible about what careers they want to choose. Kids get a feel for the practical importance of mathematics and other skills at a critical juncture in their lives.

It is through partnerships of private sector people like the manufacturing sciences people and the agencies in the executive branch that we hope can provide the kind of teamwork we need to make these transformations in the coming years.

Mr. FLAKE. I have one additional question.

After school programs are generally recreational and expanded for summer programs are more recreational than academic. Would it be possible for funding opportunities to extend the day and/or the year for those students who have shown a special aptitude in math and science? I believe that it would allow for some very intensive involvement with those young people to help them in the areas of math and science.

Dr. GIBBONS. Indeed, I think your point is well taken, and I was thinking as you concluded your remarks that I think one of the colleges that has had mandatory physical education since its beginning is Cal Tech. You feed the mind as well as the body. The two go together. I think we all too frequently think of just physical recreation. We also ought to be thinking of recreation of the mind as well. We do find, when the kids have these experiences, such as that trailer I was telling you about, that the kids want to come back after school and do some more.

These opportunities are beginning to show up, for instance, at some of the Department of Energy's national labs. There are summer programs for students to have a work experience in a working laboratory which strongly affects their future career decisions or their educational decisions.

There are also programs for teachers which have an even greater multiplier effect so that they can have those experiences in an actual working laboratory.

I think your point is very well taken, that we should try to work for additional opportunities not to abandon physical recreation but to combine that with the mental exercises that do also affect our later life so deeply.

Mr. FLAKE. Thank you very much, sir.

Chairman LAFALCE. Mr. Ramstad.

Mr. RAMSTAD. Thank you, Mr. Chairman.

Dr. Gibbons, first, I would like to invite you to come to the Third District and visit Medical Alley. I won't insist that you visit all 500 biomedical companies, but, in all sincerity, I would like to cordially invite you at some point. We would really like to have you come and visit some of the companies out there.

I applaud you and the administration for developing a technology policy and for recognizing technology as a catalyst for economic growth.

I think the main element is the second of your four elements, mainly promoting fiscal and regulatory policies that foster innovation and private-sector investment. I think in your statement here today the most important sentence is the one that says, and I am quoting now, "Unfortunately, many of our current fiscal and regulatory policies stymie rather than encourage investment in new technologies and new products." How true. I am glad to see the administration intends to change that.

You list three proposals under that. The first one I think is excellent, making the research and experimentation tax credit permanent. Your statement as to patient capital is good.

Both of those, of course, relate to fiscal policy. The other proposed change is to reform procurement policies which relates to regulatory policies, but, of course, that just relates to Government as the customer.

My concern and the concern that the biomedical community has—those companies that I am particularly concerned about—is that we reduce regulations that affect the private sector when it is a private customer buying from a private company. Now, I am certainly not advocating a laissez-faire approach to regulation, but I think we need to introduce what I call zero-based regulation.

We need to make the bureaucrats—those people who are in charge of enforcing the regulations on the books—justify each and every regulation because I think you will agree, and I think everybody on this committee will agree, that there are many which are cumbersome and unnecessary and should be eliminated or modified.

So, my question, Dr. Gibbons, and my overriding concern, is what does the administration specifically propose to reduce administrative and statutory barriers to innovation and private sector investment? What are the specific proposals to reduce the administrative and statutory barriers?

Dr. GIBBONS. Most specifically, the President has asked Vice President Gore to chair a group across the entire executive branch to take a very hard look at the entire way these agencies operate, their rules, their procedures, their administration, with several things in mind.

One is streamlining and making Government itself more efficient, more productive. The streamlining began in the White House, and they loaded two extra jobs on me without extra resources, but we agreed these things ought to begin at home. So, the Government's own streamlining by investment, for instance, in improved office equipment, as a small example, means we can be leaner and more efficient. But it is not just being more efficient. It is also being more user friendly.

I think this addresses your second issue, how can we in every one of the agencies understand what we are doing in terms, as it were, of marketing our services to clients. Some of them forget who they are working for. The Vice President's process, with each agency undertaking its own self-examination and an overarching view from his office, is well underway.

We are finding out a lot of very interesting things, I must say. The plan is by early fall of this year there will be a reporting back and a summing up of what has been found, what has already been implemented by way of administrative changes and what we will need to come directly to Congress for some assistance in doing so. So, I think, before we get to the end of the fiscal year, we should have some very definitive things in hand, hopefully some progress to show and some plans to work out with Congress.

Mr. RAMSTAD. Well, Mr. Chairman, Dr. Gibbons, I applaud you for that because, quite frankly I understand what the chairman was alluding to when he talked about a lost decade. I am not sure that is not a bit of hyperbole, but I have to agree as a minority member of this committee that we tried to get the previous administration to do just that, and it has been long overdue. I applaud you for your response and your responsiveness.

I think we need to take off our Republican hats and our Democrat hats and get down to the business of making some of these statutory and administrative changes, reducing these unnecessary regulations that really stymie the private sector. So, I am glad somebody from the real world is in this position, you having built three businesses as you stated earlier.

I think, at least based on what I have read and heard you say this morning, you do have a feel, a real understanding of what needs to be done. I am particularly impressed by your specific re-

sponse that this fall you will come back not only with recommendations, specific recommendations for administrative changes, but also for statutory changes that we as a Congress have to make.

So, keep up the good work, and I will certainly look forward to hearing your recommendations. I truly hope we can work in a bipartisan way to get rid of some of the administrative—I probably shouldn't use that word in this committee—but administrative regulations that aren't really necessary.

Dr. GIBBONS. I appreciate your comments, sir. I do feel that there is a new sense of partnership that is bipartisan and that partnership reaches between the public and private sectors in a way that is long overdue. Command and control is not the best way to go. The way to go is to recognize mutual self-interest and then pull on the same oar.

Mr. RAMSTAD. Thank you, Mr. Chairman.

Chairman LAFALCE. Thank you, Mr. Ramstad.

Insofar as the lost decade, I would commend a recent book entitled, "Losing Time." Are you familiar with it?

Dr. GIBBONS. Yes; thank you.

Chairman LAFALCE. It is an excellent book, and it looks at the time that we have lost over the past decade in not adopting some of these policies.

Ms. Margolies-Mezvinsky.

Ms. MARGOLIES-MEZVINSKY. Thank you.

I just wanted to ask you briefly if you could give us some kind of perspective on where we are with regard to Japan and Germany, how much behind we are, where you think we are, and how we can catch up.

Dr. GIBBONS. Well, I don't think I can reduce it to a formula, but I would be pleased to make a few observations for you because I think it is a very cogent point. As the person said, well, how are you doing? The answer was, compared to what?

If we look, for example, at the accessibility of a small business person to state-of-the-art knowledge, say in manufacturing or information technology or the like, we find that relative accessibility to that kind of help is very much less here than it is in Japan and in Germany.

As this committee knows, if we were to have as much technology extension service capability here as they have in Japan, we would have something like 700 centers across the country. We have a very minor fraction of that number.

Chairman LAFALCE. We had proposed a decade ago extension centers similar to the agricultural extension services so that we could have this flow of information to the small businesses we don't have. Please proceed.

Dr. GIBBONS. The States have picked up on a lot of this. There are some very well-tested programs now in selected States—in Ohio, in Iowa, in a number of different States, Tennessee—that form a body of experience that we can now, I think, hopefully, build on quickly to enable that kind of service to be more readily available around the country.

At the same time, Federal resources of enormous potential to assist in that process were essentially kept out of that market. Now one finds this new sense of accessibility of nonmission agency inter-

ests to some of our large Federal laboratories enables them also to participate in this process. So, there is a kind of opening up and an entering in to assist the States in this kind of effort of making it easier for small organizations, especially, to access areas of specialized knowledge that will enable them in turn to be more creative and more productive.

We don't think we should be building a bunch of new buildings. We think what we ought to be doing is taking the knowledge and capabilities of the Federal Government and using that to assist a lot of those things that are already out there working well. So, that is one area where we feel we have some things to learn, especially from Japan.

As another example, Germany, which has roughly the same environmental laws that we have, has not only passed the laws about environmental performance, but also provided technology assistance to those people who had to implement those laws and make it work in their factories. There was more of a sense of assistance as well as insistence on certain performance.

With the insistence on performance came the technical assistance to make it possible. Again, that reflects a kind of partnership, coventuring between aligned public and private interests that we believe we can do here as well.

Those are just two examples.

Ms. MARGOLIES-MEZVINSKY. Could you be somewhat anecdotal and tell us of a program that works in a particular State? Give us an example of something you think would be a prototype.

Chairman LAFALCE. Could I just intervene for a second?

Please answer the question. But in 1990, we, out of this committee, passed a pilot program called TAP, the Technology Access Program, and that provides small companies in six pilot States with what we hope will be efficient access to outside technical expertise and information. As you answer her question, I hope you would specifically comment, too, on the implementation of that TAP Program to the extent you are knowledgeable about it.

Dr. GIBBONS. Thank you, Mr. Chairman.

Let me give you one experience. I would like to talk about several of them, but I think I should pick one from a State in which I resided for a number of years, in Tennessee. The State University Land Grant System, especially the colleges of engineering, operated under auspices of the State government, assisted by Federal grants, I believe including the TAP Program. University resources could be brought to bear and to respond to inquiries, and requests for assistance from small business, any businesses around the State, particularly small businesses. Small and young businesses typically ask more frequently for this kind of assistance.

When the Saturn plant was built outside Nashville, that management went to the nearby university, an engineering school, and resolved a lot of their in-process engineering problems with the assistance of the engineers from that university. So, there was a partnership between the State, the Saturn plant, and one of the universities in resolving their problems as they went along. Of course, that has been a rather fine success story.

Here we see locally derived activities matching local needs, and in our economy that is always key. Everything is local ultimately because it is local resources, local markets, and the like.

The involvement of the States is very real and important because of the local differentiation. The involvement of the institutions of higher education is important because you are tapping people with special knowledge at a small incremental cost, and that, in turn, affects the way the professors think in the classroom and do their work. It has a feedback there as well.

Then, finally, not only through such things as TAP but through involvement of a national laboratory there—the one at Oak Ridge—we were able to give even greater skills availability and consultative availability than would have been the case otherwise. In this case then, we have private sector concerns, the local and State governments, and the Federal Government, in two ways, by its presence in its own facilities around the State and also the overarching support through such things as TAP.

I think you could probably identify at least a half a dozen States as having this kind of situation. When policies that encourage spin-out of ideas, modern equivalents to the old Route 128 and Silicon Valley are combined with a new kind of openness, you find just a lot of things happening there.

I will give you one final example. In the corridor between Oak Ridge, the laboratory, and Knoxville, the University of Tennessee in eastern Tennessee, there are, I think, almost 200 new industries. Many of them are technology based and have derived from ideas that emerged from the university and from the laboratory and were in a seed ground that encouraged this kind of risk taking and assistance in early startups.

I think if we take a snapshot of these dozen or so things around the country that are happening and help the Federal Government help understand and evaluate those things and then feed that back so that it can be a transportable experience, then we will have played the right kind of catalytic role to help people understand what works, what doesn't work, and how they could be a part of it.

Ms. MARGOLIES-MEZVINSKY. Thank you very much, Mr. Chairman.

Chairman LAFALCE. Mr. Collins.

Mr. COLLINS. No questions. Thank you.

Chairman LAFALCE. Mr. Poshard.

Mr. POSHARD. Thank you, Mr. Chairman.

Mr. Chairman, I would like to thank you for holding this hearing on the administration's technology policy. I think, because of your work on the SBIR Program, the Federal Government and this country have advanced their technology, especially in the area of small business and small business application.

Last year under your leadership you launched the initiative to pilot the Small Business Technology Transfer Program which builds on the success of SBIR, and I appreciate that Dr. Gibbons.

I would like to urge the administration to actively support this new initiative, the STTR, and I appreciate the time you spent with us before the meeting in discussing that on an informal basis. I think it will serve a central goal of the administration's technology policy because, for the first time, we can create an efficient vehicle

enabling any university or Federal laboratory researcher who has a commercially promising idea to spin off that idea by joining forces with a small, high-technology company.

I know that you are aware that fully one quarter of all the R&D scientists and engineers in this country, 250,000 technical professionals, work in the universities and the Federal laboratories.

I understand, in fact, that in your career earlier you were a physics researcher at Oak Ridge National Laboratory, so I know you are aware that many of these tens of thousands of researchers in the universities and the Federal labs recognize important commercial applications to their research. But the way that research funding works in this country and the way that these researchers are rewarded professionally, there now exists no efficient mechanism enabling these researchers to spin off their ideas.

As a consequence of that, we spend a lot of money and a great deal of time in this country in basic research. Other countries of the world, as was testified before this committee last year, come here, buy our basic research, take it to Japan, Germany, and other places, and turn that into commercial products, and then beat the socks off of us in the marketplace. I think STTR speaks to that gap in our system and am hopeful that the administration will recognize that and promote this program.

John Preston from MIT came in and talked about the ability of the STTR to create other Route 128's and Silicon Valleys in this country. Now I understand, of the five agencies directed to establish STTR pilot programs, that right now only DOD and DOE are moving ahead expeditiously on that. In fact, it is my understanding that the National Science Foundation is not choosing presently to move ahead despite the legislation, and I would hope that the administration could direct the agencies to fully implement STTR in accordance with the law.

As you know, it had the strong support of four congressional committees, it costs no additional money whatsoever, and we think it would serve a tremendously important goal of the administration. I want to thank you for including the STTR in your technology development program for the administration.

Dr. GIBBONS. Thank you, sir.

I have been through some of these experiences personally. I take a personal, strong interest in these ideas of trying some new things. We should be a Nation that innovates all the time and that means evaluation as you go along so you learn and feed that back to the process.

As I understand the STTR, it does contain that sense of pilot projects, of evaluation and testing of an idea. Certainly, from my experience, there is that extremely fragile time in which a person has a new idea, a new discovery, or a new sense of an opportunity and would like to do something with it, and, typically, there are two or three things that have to be overcome.

One is you need an environment in which the transition from the life-style of a researcher to that of an innovator and entrepreneur is encouraged. That is a sea change in many of these institutions, both universities and laboratories.

The second thing is, as we discussed, while a person may have an excellent technical idea or a market opportunity, a notion, it takes

a combination of skills in order to make a successful business. Many of those that I have seen that didn't make it can be characterized by a person who really thought that all they needed to know was the technology, or all they needed to know was the market, and they have to understand that a success comes from the right technical ideas, a sense of the market, a sense of manufacturing quality control, financing, and other things.

So, it seems to me the STTR, in pairing the entrepreneur with other individuals' skills, enormously amplifies the opportunity or the chance that idea will take hold and bear fruit.

Obviously, access to venture capital, to equity, to patient capital is particularly difficult at that very earliest stage. It is that first \$100,000 or \$1 million that is a lot tougher than the \$50 million that might be needed later on. I think that is why this idea of STTR is intriguing and well worth looking at very carefully.

Now I do understand that each of the agencies are looking at these ideas carefully. Some of them are less secure in their particular role in doing it. For instance, NSF, I believe, is studying it directly. Others feel, for a variety of reasons, that they want to move right on ahead with it, as I think you mentioned Defense and Energy. I think all should be counseled to proceed with deliberation.

We know within the executive offices of the President we are going to be listening to those agencies and trying to work with them to make sure that we can put the very best of our collective resources together on these kinds of new ventures.

Thank you.

Mr. POSHARD. Thank you, sir.

One other thing I might mention.

For those of us who represent rather large rural districts, and who are undergoing and have undergone health care reform for several years now, and are just trying to hold on to the system that we have or improving it, we appreciate the administration's initiative on the information infrastructure because we really believe it has application in the rural areas of this country for health care and appropriate health care. So, I wanted to thank you for that, for moving ahead on that. I think you are on the cutting edge of technology improvement here.

Dr. GIBBONS. Thank you, sir.

Chairman LAFALCE. Mr. Huffington.

Mr. HUFFINGTON. No comments.

Chairman LAFALCE. Dr. Gibbons, we have changed the name DARPA to ARPA. Somebody told me that at one time before it was DARPA it was ARPA.

Dr. GIBBONS. That is right. We have come full circle.

Chairman LAFALCE. Can you give me a little bit of the history? Do you know the history of it?

Dr. GIBBONS. As I understand the history, it is that what we have done in taking away the D from DARPA was to have that as a clear signal.

Chairman LAFALCE. I know that. I am talking about prior.

Dr. GIBBONS. Oh, prior history?

Chairman LAFALCE. When was DARPA created and when did it go from ARPA to DARPA? I don't know.

Dr. GIBBONS. The Advanced Research Projects Agency was chartered in 1958. Its name changed to the Defense Advanced Research Projects Agency in 1972. The name reverted to ARPA on March 15, 1993.

Chairman LAFALCE. Are you giving any advice now that we have gone from DARPA to ARPA as to where ARPA should be located, Defense or Commerce or someplace else?

Dr. GIBBONS. Well, we believe that ARPA has a role right within the Defense Department in that the Defense Department is very seriously trying to reorient itself to become an agency that understands the reality that much of advanced research and ideas that are needed by the military actually flow in from the private, from the commercial sector, the civilian sector rather than out from the military in the other direction as I mentioned earlier this morning.

At the same time, the Defense Department does have very clearly an imperative to maintain a defense technology base as defined by the new force structure and other requirements of defense, so we need an ARPA for defense needs alone.

At the same time, the extent to which those mission-oriented needs are relevant to the civil sector, they want to reemphasize that. So, throughout the Defense Department they are trying to talk about dual use in a very serious way that I haven't heard for 20 years.

Chairman LAFALCE. I am encouraged by that. Somebody told me the decision has been made to switch ARPA to Commerce, and has the decision been made the other way? Is it still in discussion?

Dr. GIBBONS. There is no discussion, to my knowledge, of moving ARPA to Commerce.

There is, however, a very clear sign that the ARPA experience of innovation and very innovative joint ventures with the private sector is going to be tried elsewhere. At NIST, the National Institute for Standards and Technology, we will focus programs that look a little like ARPA but are in the civil sector and are more diverse than ARPA, which has been more focused on very advanced technology, mostly relevant to defense.

Dr. Arati Prabhakar, who was a leader in technology within ARPA, is now the designated director of the NIST. What we are trying to do, Mr. Chairman, is not to create some new organization called a civilian DARPA but rather capture the resources that lie in the Department of Energy laboratories, the NIST and other parts of the Federal Government and create out of this a set of activities that collectively give us great strength in the civilian sector.

Chairman LAFALCE. Let's talk about this. Now, you are the Director of the Office of—what—Science—

Dr. GIBBONS. Science and Technology Policy.

Chairman LAFALCE. To what extent are you simply an adviser and to what extent are you a manager? To what extent do you just whisper in the ear of the President or some others in the White House? To what extent do you have line control over program delivery?

Dr. GIBBONS. First of all, I should point out that my office, even though it also now includes the National Space Council activities and the National Critical Materials Council activities, is a small

operation. It is about one-fourth the size of OTA. Our role is not to run programs.

Chairman LAFALCE. What is small? About how many people?

Dr. GIBBONS. We will have 40 people when I get fully staffed. Our role is to be——

Chairman LAFALCE. Who has replaced you at OTA?

Dr. GIBBONS. What about OTA? Excuse me.

Chairman LAFALCE. Who is the head of OTA now?

Dr. GIBBONS. The new Director of OTA is Dr. Roger Herdman, who was Assistant Director when I was there for the Health and Life Sciences area, a very interesting person who has some small business experience in his background as well as being vice president of Sloan-Kettering and other things before he came to OTA.

But the role of OSTP, in our perspective, is to be a catalyst for the President, for the administration, in helping draw together the collective interests and capabilities of the executive branch agencies, particularly in those areas where they have programs that are aligned in similar directions, for instance, education, transportation, and environment.

Chairman LAFALCE. What mechanisms do you use to accomplish this?

Dr. GIBBONS. Our mechanism is the so-called FCCSET process, the Federal Coordinating Council.

Chairman LAFALCE. What do you call FCCSET?

Dr. GIBBONS. FCCSET, Federal Coordinating Council For Science, Engineering and Technology.

Chairman LAFALCE. OK. I was trying to come up with the words for FIXIT.

Dr. GIBBONS. But we use that mechanism and our other capabilities to convene the agencies and help—as the Vice President says—the whole be greater than the sum of the parts in terms of a well-coordinated executive branch programs. That, it seems to us, is a much more productive way to get things done than to try to do major reorganizations in Government, which take a lot of time but never work very well.

Chairman LAFALCE. I agree. Because there are so many different programs, you have to coordinate. Of course, this is especially the problem with the small business community because it is almost a full-time job, just figuring out what the programs of the Federal Government are. If you are a small businessman, you just want help.

Dr. GIBBONS. Exactly. For instance, when we came to New York and other cities around the country a few weeks ago, there were five major Federal agencies acting as one body to go up and reach out and meet with entrepreneurs, business people, educators in each of those regions. I thought it was very interesting because all five agencies were speaking as though they were one voice or one group. I was very encouraged by that process.

Chairman LAFALCE. What do you mean when you went up to New York?

Dr. GIBBONS. There was a meeting held in New York City, another in Los Angeles, and meetings in half a dozen cities. Five agencies went and made presentations in one meeting on programs that could be of assistance to small businesses, to businesses that

were trying to convert from defense contracts to civil sector things. It was a one-stop shop to all of the programs that these five agencies had available.

Chairman LAFALCE. Could you send me a copy of the typical program for those visitations?

Dr. GIBBONS. We would be delighted to supply that to you, sir. [The information may be found in the appendix.]

Dr. GIBBONS. There is another thing—

Chairman LAFALCE. Is that something that could be replicated for other reasons in the country or other cities?

Dr. GIBBONS. I think it may well be. The cities were chosen so that people could come in from those regions, and I think there were six—

Chairman LAFALCE. For the small business person, it is tough to—

Dr. GIBBONS. Can't go very far.

I think what we should think about is how we could translate that into materials that can be made available so that the person doesn't even have to leave his hometown to access some of that. As you know, the thing we need to work on so hard is to understand what it takes to access.

Chairman LAFALCE. What about a teleconference?

Dr. GIBBONS. Teleconferencing is OK, and I have been on a couple of those in recent weeks. They are also not cheap compared to the written word, and we hope that we can provide better information in written context as well as in access through teleconferencing and these major conferences. But we will try to expand this.

My colleague just pointed out to me that we did five cities originally. I think I said six. We are doing five more, apparently, now and, depending on the outcome of those, we will try some more of that. As long as it works, we are going to keep working at it.

Chairman LAFALCE. Do you have any idea the percentage of attendees that were small businesses?

Dr. GIBBONS. It is a good question, and I would have to answer for the record.

[The information may be found in the appendix.]

Chairman LAFALCE. I was just wondering if we are sending all the Motorolas.

Dr. GIBBONS. In New York, I know there were nearly 1,000 people who came to it. My impression was that there were some large companies there, but I think it was dominated by the small business people.

Chairman LAFALCE. Do you have any office within the Small Business Administration that you try to interface with—or not personally—to help you bring technological expertise to the small business community? I am just wondering if we could use the SBA offices throughout the United States, their management programs, or the SBDC Programs, or whatever it might be as arms and ears of your office in a certain sense for this purpose.

Dr. GIBBONS. I should think that would be a very important resource in this collective use of Federal resources in these areas because these folks have been in the business—

Chairman LAFALCE. That is something that you should perhaps explore. We have an SBDC network, virtually every State in the

country. To what extent can we interface with them and utilize them, too? Most of them are connected with universities.

Dr. GIBBONS. I think it is an excellent question, Mr. Chairman.

One of the things I intend to do when I get back to the office from this hearing is to recheck on how well we have been able to interface with SBA in these plans. I know that the new administrator is just coming on board, and we certainly look forward to working with him.

Chairman LAFALCE. Sworn in yesterday.

Do you have a feeling for how the pilot TAP Program has been working?

Dr. GIBBONS. Not firsthand. I would have to check with my folks about that.

Incidentally——

Chairman LAFALCE. Do you know who it is under? Who is responsible for TAP? I have forgotten. Is it administered by NIST under contract with SBA?

Dr. GIBBONS. The Technology Access Program [TAP] is funded by the SBA and administered through NIST in conjunction with their Manufacturing Technology Centers and the State Technology Extension Programs.

Dr. GIBBONS. There is one other thing I should mention with respect to SBA. I mentioned the FCCSET process. We have organized what we call a deputies group or an S&T deputies group which meets with me on specific-planning out how we can best use the FCCSET process. Representatives from the Cabinet, agencies, and administrations are there, and that does include the SBA. SBA is a part of the deputies group.

Chairman LAFALCE. Thank you, Dr. Gibbons. I only have about three minutes, so I am going to bring the hearing to a close.

Thank you very much for your excellent testimony. We look forward to working with you.

Dr. GIBBONS. Thank you, Mr. Chairman.

[Whereupon, at 12 noon, the committee was adjourned, subject to the call of the Chair.]

APPENDIX

STATEMENT OF REP. JOHN J. LaFALCE, CHAIRMAN COMMITTEE ON SMALL BUSINESS

HEARING ON TECHNOLOGY POLICY AND THE ROLE OF SMALL BUSINESS MAY 13, 1993

It gives me great pleasure to welcome Dr. Jack Gibbons, the President's Science and Technology Adviser, to our Committee. For the first time in recent memory, this country has a President and an Administration that is committed to a comprehensive technology policy, that believes government can and should play a key role in stimulating technological advance, and that recognizes the importance of small companies in technology, innovation, and job growth.

I have great respect for Dr. Gibbons. It was his leadership, over the past decade, that made the Office of Technology Assessment into the effective and respected organization that it is today. In 1984, when I chaired the Banking Subcommittee on Economic Stabilization, I worked closely with OTA on the Advanced Technology Foundation bill, H.R. 4361, which would have supported research on generic technologies with commercial application, and would have established a Federal Industrial Extension Service. OTA reported that the Advanced Technology Foundation "could be a major step in deepening and broadening the technological foundations for U.S. industry." I believe that our work with OTA on this concept a decade ago helped to lay the foundation for some of the proposals under discussion today, including the Administration's proposal to create a national network of manufacturing extension centers and to expand federal funding for pre-competitive R & D projects with commercial relevance.

Technology is a critical policy area. Studies conducted over the past thirty years show that technological advance is the single most important influence on productivity growth, accounting for roughly 50 percent of the growth in GNP per person employed during this century. If this Administration can design policies to effectively spur technological advance, we will be a long way toward realizing the central goal of this Administration: increasing the long-term growth rate of the American economy.

I want to open this hearing by drawing attention to a very important -- and little noticed -- development in the American economy. We have all heard about the retrenchment of large technology companies like IBM and United Technologies. What is not widely recognized is that small high-tech companies have been growing at an extraordinary rate, transforming the high technology sector of the economy and making an increasingly significant contribution to technological advance.

By almost any measure, high-tech small businesses have been the star performers in the U.S. economy in recent years. They have

been the fastest-growing segment of the U.S. economy by far, with employment expanding more than 2 1/2 times as fast as job growth in the overall economy, and more than twice as fast as job growth in either the high-tech sector or small business sector generally. Over the past decade, small businesses' share of the nation's scientists and engineers engaged in R & D has increased 150 percent.

The best explanation for this remarkable surge is that the market recognizes the innovative advantages of small businesses. Careful empirical studies show, for example, that small companies contribute, on average, more than twice as many innovations per employee as larger companies. Small companies also contribute a disproportionately large share of the most significant innovations, including such notable examples as the small computer (Apple), the supercomputer (Cray), the planar integrated circuit (Fairchild), and the Xerox copier (Haloid). And, through the Small Business Innovation Research (SBIR) program, small companies have shown that they are, on average, significantly more effective than other federal contractors at converting federal research dollars into commercial technologies, as documented in recent GAO studies.

The success of this country's technology policy may well depend on whether we can effectively harness the innovative talents of high-tech small businesses and expand their role. President Clinton and Congress have this powerful resource at their disposal for investing in the economy. Let us recognize its importance and use it effectively.

Over the past twelve years, it has rested almost exclusively with the Congress to initiate technology policy, often with resistance from the Administration. This Committee, I am pleased to say, has been at the forefront of many of those initiatives. In 1982, this Committee initiated the Small Business Innovation Research (SBIR) program, a bill which I managed on the House floor. Today SBIR is regarded as one of the most effective technology programs in the federal government. Incidentally, the lead advocate for SBIR on the House Science Committee was now-Vice President Al Gore, who at the time chaired the Science Subcommittee on Investigations.

In 1990, this Committee initiated the Technology Access Program, a six-state pilot program administered by NIST and SBA to enable small companies to efficiently access outside knowledge and expertise.

And last year, this Committee initiated legislation reauthorizing and significantly expanding the SBIR program, and establishing a pilot Small Business Technology Transfer (STTR) program at five federal agencies. STTR will, for the first time, create an efficient vehicle for the widespread commercialization of university and federal laboratory research, by drawing upon the

innovative talents of small, high-tech companies. One of our concerns in this hearing is to review whether STTR is being fully implemented by the agencies in accordance with last year's legislation.

Dr. Gibbons, I look forward to your testimony, and I look forward to working closely with you in your new position.

Opening Statement
U.S. Rep. Jan Meyers (R-KS)
House Committee on Small Business
"New Technology Initiatives"
May 13, 1993

Mr. Chairman, thank you for holding this hearing on President Clinton's new technology initiatives and for the opportunity to promote small business as the touchstone for innovative ideas and products to carry us into the 21st century.

Having reviewed the President's February 22nd outline, "Technology for America's Economic Growth; A new Direction to Build Economic Strength," let me honestly say that there is much in it to support.

Coordinating the various federal research and development programs to eliminate duplication and waste in favor of efficiency and effectiveness is essential. Similarly, ensuring some harmony between our economic and tax policies with our nation's technology needs is an idea whose time has most certainly come.

With the reductions in defense spending, seeking new dual-use R & D projects, efforts that can serve the government's needs while offering commercial viability in the private sector, becomes essential, although it has always been an important goal. And reducing the regulatory roadblocks to public-private ventures strikes the chord of common sense in me.

Still, I was somewhat disappointed that the President and Vice President did not acknowledge the unrivaled success of the Small Business Innovation and Research Program. Since 1982, small, smart, and agile SBIR firms have researched, developed, and brought to market amazing products and services that have added tremendously to our quality of life here at home and our ability to compete abroad -- all while meeting the needs of federal agencies of all descriptions.

I would hope the President would draw on this success and expand on it, rather than creating new programs and bureaucracies where none may be needed.

And I hope he will watch and tap the potential of the Small Business Technology Transfer Program, or STTR, that the Chairman shepherded through Congress and into law. By combining the unique resources of our colleges and universities with the equally impressive resources of our country's entrepreneurs, we may create a source of innovation, production, and marketing unparalleled by any other nation in the world.

Mrs. Meyers
Page 2

Still, I think in all of this we must remember that it is the combined forces of the free market system, the entrepreneurial spirit, and America's well-earned reputation as thinkers and tinkers that made us the premier innovators in the world -- and will do so again.

Instead of trying to manage these energies from Washington, let's work to unleash them. Let's remove the barriers that keep the private sector from developing bright, new, shining ideas.

Let's erase antitrust impediments to joint ventures and other consortia that keep enterprises from forming project-specific or quick-response cooperatives. Let's try to reduce the burden of federal regulations that slow small businesses down and infuse flexibility into the regulatory scheme so that small firms can apply new techniques to old problems.

Finally, let's adopt economic policies that promise long-term stability, preserve the limited capital reserves of small enterprises, and expand the overall supply of capital so they can have access to the loans they need -- all of which promote investment in our nation's future.

Mr. Chairman, thank you again for holding this hearing. I look forward to reviewing the transcript for ideas and insights. And in there, somewhere, I hope to see an inkling of the notion that the private sector will work for us if only we will let it.

OPENING STATEMENT OF

Honorable LARRY COMBEST (TX-19)

HEARING: THE CLINTON ADMINISTRATIONS NEW TECHNOLOGY INITIATIVE

MAY 13, 1993

10:30 A.M.

I commend the Chairman on calling today's hearing to examine the Clinton Administration's new technology initiative.

I am pleased that the administration has recognized the need for small business to finally get a fair share of the estimated \$75 billion in federal research and development funds. We must realize that technology breakthroughs have historically occurred in the small business sector, with 50 percent of all patents coming from these folks.

The two programs that this committee has jurisdiction over relate to the Small Business Innovation Research (SBIR) program and the Small Business Technology Transfer (STTR) program.

The SBIR program was successfully reauthorized last Congress and reflects one of the programs that have given small business a reasonable shot at federal research and development dollars. The program aims to:

- * Stimulate technical innovation
- * Employ small businesses in federal research and development
- * Increase private sector commercialization of federally derived research and development funds.

The Government Accounting Office has found that the SBIR program is an effective tool for stimulating technological innovation by small companies, while at the same time meeting the government's research needs. This program is paramount if U.S. small businesses are to keep pace with our European and Asian neighbors in the competitive global economy.

Within the reauthorization legislation last year, a separate, parallel program, the STTR program, was adopted. It is aimed at helping small businesses to have the ability to more aggressively commercialize the research and development activities funded by the U.S. government at universities and laboratories. The STTR program recognizes the nation's past shortcomings in harnessing our undisputed world leadership in basic research into tangible

economic advantages. The major difference between the SBIR program and the STTR program is that the latter is designed specifically for technology transfer. This is one of the primary issues that the subcommittee on which I am the ranking member is planning on pursuing.

I am very interested in hearing today how the Clinton Administration will effectively use the tools now available in regards to technology transfer and how they propose to pay for their new initiatives.

With that said, I must admit that I am more than a little skeptical about how the administration's technological initiative meshes with its economic plans. One would think they would work in tandem to deliver incentives for small business to grow, innovate and therefore increase employment. But as a famous Texan with big ears says, the "devil is in the details."

The details of President Clinton's budget proposal seem to place the 20 million small businesses in a tax purgatory. It proposes to increase corporate income taxes, personal income taxes, BTU tax, Social Security taxes and estate taxes to name a few. Add to this the possibility of increased payroll taxes for health care, job training surtaxes and more federal mandates and I believe that any incentives for technology and innovation may get lost in the blizzard of higher federal taxes and regulations.

**STATEMENT BY CONGRESSMAN JIM RAMSTAD
BEFORE THE HOUSE SMALL BUSINESS COMMITTEE
May 13, 1993**

**HEARING ON THE CLINTON ADMINISTRATION'S
NEW TECHNOLOGY INITIATIVE AND ITS IMPACT ON SMALL BUSINESS**

Mr. Chairman, I am pleased to have Dr. Gibbons with us this morning to discuss one of the most important issues facing our economy -- the development and marketing of technology.

I must say I am extremely concerned that today's high tax and regulatory environment is making it increasingly difficult for the technology-driven companies in this country to continue to innovate and compete.

I read with great interest the Administration's publication "Technology for America's Economic Growth, A New Direction to Build Economic Strength."

While I certainly applaud President Clinton and Dr. Gibbons for their recognition of the importance of technology to the economy, I have fundamental reservations about the government-directed, government-funded industrial policies outlined in this proposal.

Private capital -- not taxpayer money -- is the appropriate financing mechanism for research, development and marketing of new technologies. And individuals and businesses -- not bureaucrats and politicians -- are best equipped to make sound and efficient investment decisions.

That's why the "technology policy" I support differs dramatically from the Clinton Administration's proposal to put the government in charge of innovation and why I feel their proposal does not address the fundamental problems facing our high-technology companies.

Government doesn't innovate and doesn't create jobs -- small businesses do. We all know that small businesses provide 85% of all new jobs in this country, but according to the SBA, small businesses also provide about 2.4 times as many innovations per employee as large firms.

Instead of increasing the government's control of the high-tech industries in our economy, we must reduce governmental obstacles -- taxes and regulations -- to private sector initiative.

Lowering taxes to reduce the cost of capital is an essential component of promoting a strong technological base.

I refer you to a column, which I ask your permission to enter into the hearing record, published in the Wall Street Journal last month. It was written by an entrepreneur, T.J. Rodgers, who built Cypress Semiconductor from a one-computer company to a corporation that has, in its 10 year history, generated over a billion dollars in cumulative revenue, made more than \$160 million in profits -- on which it paid \$60 million in taxes -- created 1500 jobs and paid cumulative salaries of nearly \$500 million, on which employees paid taxes of \$150 million.

Rodgers' column, entitled "What Silicon Valley Needs from Clinton," rejects the President's call for subsidizing high-tech companies. Instead, he urges the President to improve the financial infrastructure by increasing the supply of capital by reducing federal spending and decreasing the capital gains tax -- not by creating government-funded research programs.

(MORE)

Murray Weidenbaum of the Center for the Study of American Business urged similar action on "technology policy" in the Harvard Business Review a year ago. He wrote, "The availability of capital to develop technology is another crucial element. During the 1970s and the early 1980s, venture capital fueled entire new industries, such as semiconductors and biotechnology. Over the past five years, venture funding has steadily declined." We all know the capital gains tax rate was reduced in 1978 and raised again in 1986. There should be no question about the correlation between the availability of capital and the taxes imposed on capital gains.

The other main issue facing high-tech companies is excessive government regulations. A perfect example of overregulation involves several of the so-called Medical Alley companies located in my district of the Twin Cities area of Minnesota. Medical Alley is a corridor of over 500 medical-related companies.

One of these companies, Medtronic, developed the first wearable external cardiac pacemaker in 1957 and manufactured the first reliable implantable pacing system in 1960. Since then Medtronic has been the world's leading producer of pacing technology. Earl Bakken, the founder of Medtronic, has often said he could not start Medtronic in today's regulatory environment.

Other biomedical companies in my district have told me chilling stories about the bureaucratic hoops they are made to jump through to get approval from the FDA for their products. I have heard about instances where the FDA was supposed to review their proposals within 90 days, but after 300 days, companies are still waiting for an answer. Government regulations that make it difficult for companies to predict when they might take a product to market literally make it impossible to attract investors and sustain the innovative, job-creating enterprises that should serve as the foundation of our nation's economy in the next century.

When government agencies adopt such an adversarial stance, companies are literally regulated out of business -- and the American public suffers. Loss of innovation through overregulation will have a direct impact on the health of our economy and our citizens.

Mr. Chairman, I am very much looking forward to today's testimony. I know Dr. Gibbons is genuinely interested in stimulating technological development, and I welcome this opportunity to dialogue with him and find out exactly what the Clinton Administration will do to maintain a vital and growing technological sector of our economy.

What Silicon Valley Needs From Clinton

By T.J. ROGERS

My company, Cypress Semiconductor, makes data-communications chips used in electronic superhighways, memory chips for supercomputers, and microprocessor modules for massively parallel computers, a kind of supercomputer. It might appear that we would benefit greatly if billions of taxpayer dollars were showered on various technology projects favored by the Clinton administration. But such subsidies will hurt our industry. Why? Because it is impossible to separate the Clinton technology program from the administration's broader "tax-and-spend" economic plan. And "tax-and-spend" programs can't help businesses, including mine.

The administration would have us believe that the business leaders of Silicon Valley stand unanimously behind it. But many of us disagree with the proposition that the right way to enhance America's technology leadership is to increase taxes to finance government mega-programs—even if the mega-programs support technologies being developed by those companies.

There is a second dangerous misconception in the president's economic program—it preaches the politics of envy. Yes, the White House tells the American people, we plan to increase spending by hundreds of billions. But we plan to spend that on "you." Even better, "they"—the bad guys—pay for it. To describe the "bad guys," politicians offer caricatures—images of Michael Milken and Ivan Boesky "defrauding investors. Who wouldn't want a tax such 'excesses of the 1980s'?"

A Success Story

So please allow me to introduce myself—I am an excess of the 1980s. Through Cypress, I became a paper millionaire in the 1980s—eight times over, in fact.

How did I profit? I started a company in Silicon Valley. I obtained stock in that company when it had one employee (me) and one used computer. Over its 10-year history, Cypress has generated more than \$1 billion in cumulative revenue, made more than \$160 million in profits on which we paid \$60 million in taxes, created 1,500 jobs and paid cumulative salaries of nearly \$500 million, on which our employees paid taxes of \$150 million. All our employees own Cypress stock.

I am a person of simple tastes; therefore, I still have most of the wealth associated with my Cypress shares. What have I done with that wealth? I invested it. In fact, I invested it in precisely the kinds of companies on which the administration wants to shower taxpayer subsidies—the world's most advanced competitors in fields such as semiconductors, biotechnology, software, networking, environmental sciences and health care.

Nearby is a list of some 100 companies in which I hold investments through my participation in three venture-capital funds. Eighteen of those companies are innovators and leaders in high-speed data communications. Other companies are innovators in the field of high-performance computing.

THE WALL STREET JOURNAL MONDAY, APRIL 12, 1993

Every incremental dollar that Washington takes from me comes directly out of my investments in these companies. Under a higher tax regime, I cannot sell my house or car. But I am going to invest less. After all, the cash to pay my higher taxes has to come from somewhere. Essentially, the administration is arguing that by taking my money in the form of higher taxes and "investing" it in subsidies, it can make better investments than the venture-capital firms with which I invest—firms that are already the envy of Japan and Europe. That logic defies common sense.

The Clinton plan also raises taxes on Cypress as a corporation. Suppose, as a result of the plan, that Cypress's corporate taxes increase by \$1 million next year. As chief executive, my only choice is to take that money directly out of R&D—our lifeblood. A tax increase of \$1 million means that Cypress will employ 10 fewer Ph.D. technologists than it would otherwise.

The third misconception in the Clinton plan brings us directly to high technology and high-performance computing. It is the proposition that the best way for good ideas to become marketplace realities is for government to subsidize them.

What does work, then? The free market. Today, in industry after industry—semiconductor chips, computers, biotechnology—U.S. companies lead the world or are demonstrating remarkable comebacks. American performance has relied on the invisible hand while Japan and Europe have relied on government targeting and subsidies. To see the drama in this, think back to just five years ago, when America was in a panic about the Japanese government's high-definition television program, or HDTV. Today, everyone agrees that it was a multibillion-dollar flop and that America has won—thanks to the messy, uncoordinated innovations of many private companies. We also lived in fear of the Japanese Fifth Generation Computer Project. "Tron" was going to walk, talk and eat our lunch. It too failed.

Or think about Europe. Amazingly, we still have "experts" who want us to emulate its alphabet soup of technology consortiums such as JESSI, Europe's equivalent of the U.S. chip consortium Sematech. JESSI showered billions on the European semiconductor industry. It also "rationalized" the industry by allocating market segments to various companies. Siemens became the DRAM (dynamic random access chip) company for Europe—and has since gone out of the business. Philips became the SRAM (static random access chip) company for Europe—and has since gone out of that business. Today, there is no major European chip industry or computer industry to

speak of—thanks to the role of programs like JESSI. In the U.S., Sematech itself sometimes slowed the progress of the semiconductor industry.

The new administration's programs represent the same kind of misguided industrial policy. For example, the administration proposes big spending increases on a range of projects to speed creation of the "data superhighway."

The trouble here is that multiple, competing data highways are already being built by private companies across the U.S. Entrepreneurs are racing to develop new networking systems, new software interfaces, new value-added services. MCI, AT&T and Sprint already have three independent, coast-to-coast, fiber-based long-haul networks. The real issue is extending those networks into the home. The role for government in this is to untangle bureaucracy and regulations that prevent companies from hooking up the "last mile" of fiber to the home. For example:

- The regional Bell operating companies would gladly hook fiber optics from the long-haul network to the home. But they are prevented from doing so by regulations that make the huge capital investments uneconomical.

- Cable operators are already hooked into 60% of American homes. They too could make the connection with existing long-haul data superhighways, but they are prevented by regulations that declare them a "natural monopoly" and restrict them to the TV and movie business.

- The long-haul superhighway could be hooked to the home through wireless circuits. But the frequencies required are currently being held up by the Federal Communications Commission.

The most constructive thing the Clinton administration can do involves improving infrastructure—not roads and bridges, or even data superhighways, but financial infrastructure. The scarce supply of reasonably priced capital deprives companies of the chance to build manufacturing muscle and create jobs.

The first step is to make more dramatic spending cuts than the ones the Democrats plan. Boeing recently announced plans to dismiss 20% of its workers. My company recently took the painful step of dismissing 20% of our workers to become more efficient. By contrast, administration plans to eliminate 100,000 federal jobs over the next four years—only 5% of a total work force of two million—do not look particularly significant.

What Is Needed

To impose true spending discipline, Congress must pass a balanced-budget amendment and approve the line-item veto. Washington should also restructure the capital-gains tax to encourage long-term investment. The Clinton administration has proposed a modest reduction in the capital-gains tax that is targeted to tiny companies. The proposal is good political symbolism, but it does not address the problems of entrepreneurs. It focuses on start-up companies, while many difficulties begin at the next stage, when a company needs that second or third \$10 million to build a plant and acquire real manufacturing muscle. This stage is when young companies must turn to the public capital markets—or to cash-rich foreign operations eager to acquire valuable American technology at bargain-basement prices. The best way to reduce the serious barriers to progress is to enact a sweeping restructuring of the capital-gains tax.

To discourage unproductive speculation, and fend off charges of creating a "tax break for the rich," we should at the same time increase taxes on assets held less than six months. We should eliminate capital-gains taxes on assets held for more than three years, assets that help build America. Assets held between six months and three years should be taxed at the current income-tax rate.

America has plenty of work to do on the economic problems we have created for ourselves—problems that trace their roots to fiscal recklessness. Ultimately, though, the economic battles of the 1990s will be won in America's factories, labs and offices—not in the halls of Congress or the corridors of the Commerce Department. America's entrepreneurs have the guts, brains and drive to beat the best the world has to offer. All we need from Washington is the confidence to let us fight.

Mr. Rodgers is president and CEO of Cypress Semiconductor Corp., based in San Jose.

VICTIMS OF REDISTRIBUTION

Mr. Rodgers has used the profits he turned through his private investments in the computer industry to help fund the Clinton administration. Many of them are the kind of high-tech business the Clinton administration hopes to strengthen. But after the Clinton tax, Miss Rodgers' company may have less money to invest in the companies. The open question is whether the administration can invest as efficiently through industrial policy.

3DO	C-Cube Microsystems (V)	Networking Computing
Altanec	Datalogix	Notable Technologies
Amylin	Delineate	ON Technology
Amylin Pharmaceuticals	Domestic Automation	Ontogen
Applied Micro Circuits	D.S.I. - David Systems	Oxford Glycosystems
Appsoft	Endosonics	O.B. Tech
Aptix	Endovascular Technologies	Paramed Technology
Artbor Development	EO Computer	Pharmacia
Ams Pharmaceuticals	Everett Systems	Plus Logic (SCIV)
Ascend Communications	Farallon	Power Integrations
Ask Computer	Genetix	Progress Software
Aspect Development	GenPharm International	Quicklogic
Ausper	Global Village	Quicrum
Avid Technology	GMS	Radius
Axion Pharmaceuticals	GO Corporation	Rambus
Banyan	Great Lakes Environ. (GLE)	Raster Graphics
Biofile	Harmonic Lightwaves	Redwood Design Auto.
BIOVS	InSite Vision	Relevant Technologies
Business Insurance	Intuit	Ribogene
Cadence	IST	Rose Communications
Camina Labs	Kera Vision	S3
Cardiac Pathways	LabIntelligence	Sengstat Medical
Cellular Data	Ligand Pharmaceuticals	Shaman Pharmaceuticals
Central Point Software	Logic Modeling	Shiva
Chemtrak	Macromedia	Shographics
Citrix Systems	Mogellan	Siena Semiconductor
Coactive Computing	Maspar Computer	Slate
Cocenas	Microchip (SCIV)	Southwest Network Services
Communications Ventures	Micraltec	Storm Technology
Conductus	Ministar Peripherals	Tivoli Systems
Covalent Systems	Mits Medical	Total Pharmaceutical (SCIV)
Crescendo Communications	Molecular Dynamics	Unisurge
CV Therapeutics	nCHIP	Vitesse (SCIV)

STATEMENT OF REP. GLENN POSHARD
HEARING ON THE ADMINISTRATION'S TECHNOLOGY POLICY

May 13, 1993

I want to thank you, Mr. Chairman, for holding this hearing on the Administration's technology policy. Because of your vision and hard work, the SBIR program stands today as perhaps the most effective technology program in the federal government, as documented by the National Academy of Sciences, the GAO, the SBA, and thousands of small companies across the country. SBIR is something that this Committee, and this country, and you personally, Mr. Chairman, can be very proud of.

Last year, under your leadership, this Committee launched another visionary initiative -- the pilot Small Business Technology Transfer (STTR) program -- which builds on the success of SBIR. Dr. Gibbons, I urge the Administration to actively support this new initiative, because it will serve a central goal of the Administration's technology policy. STTR will, for the first time, create an efficient vehicle enabling any university or federal laboratory researcher who has a commercially-promising idea to spin off that idea, by joining forces with a small, high-tech company.

I know that you are aware that fully one-quarter of all the R & D scientists and engineers in this country -- 250,000 technical professionals -- work in universities and federal laboratories. I understand, in fact, that earlier in your career you were a physics researcher at Oak Ridge National Laboratory. You are also aware,

I'm sure, that many of these tens of thousands of researchers in the universities and federal labs recognize important commercial applications of their research. But the way that research funding works in this country, and the way that these researchers are rewarded professionally, there now exists no efficient mechanism enabling these researchers to spin off their ideas. Research grants generally don't fund commercially-oriented research. And so, the commercially-promising ideas of thousands of the best minds in this country often languish in someone's head somewhere in a research laboratory and never see the light of day.

And that is one main reason why this nation has such great difficulty converting its research strength into economic strength. We are wasting the talents of a quarter of a million of our best scientists and engineers.

STTR will provide, for the first time, a systematic mechanism enabling these researchers to spin off their commercially-promising ideas. The idea is simple. STTR will provide the opportunity -- and the funding -- for a researcher with a commercially-promising idea to spin off the idea by joining forces with a small, high-tech company in cooperative research. A number of studies, as well as the testimony of experts such as John Preston at M.I.T., show that small companies are the best vehicle for this kind of technology transfer. One has only to look at Route 128 and Silicon Valley to see the truth of this.

Dr. Gibbons, I understand that of the five agencies directed to establish STTR programs, only DOD and DOE are moving ahead expeditiously. The National Science Foundation, I understand, has said it will not participate in the program, despite the legislation. I urge you to direct the agencies to fully implement STTR in accordance with the law. As you know, STTR has the strong support of four Congressional Committees; it costs no additional money; and it serves a tremendously important goal of this Administration, and of this country.

**OPENING STATEMENT OF RONALD K. MACHTLEY
COMMITTEE ON SMALL BUSINESS
HEARING ON THE PRESIDENT'S TECHNOLOGY INITIATIVES
MAY 13, 1993**

Thank you Mr. Chairman. And thank you, Director Gibbons, for agreeing to come here today to testify on the effects the President's technology policy will have on small businesses.

In his plan, Mr. Clinton has outlined a number of initiatives that are intended to help small business. Indeed, with 88 percent of all registered companies classified as small businesses, it is clear that we must focus on helping them stay competitive in an ever changing market.

In my state of Rhode Island, like other states that are heavily reliant on the defense industry, it is important to fully consider the ramifications an accelerated build-down would have on the economy. When most people think of the defense industry, they envision large firms swooping in like greedy hawks for the fresh government contracts. Although there are a number of large companies that will feel substantial losses from a reduction in the defense budget, there are even more small businesses that will be severely affected. According to a report published by the Rhode Island Defense Economic Adjustment Project, "over one tenth of the state's employers do business directly with the Department of Defense, it's contractors and subcontractors or their employees. Together, these employees account for roughly one third of the state's workforce." That is why a major concern of ours must be workforce retraining. We also can not discount the possibilities of transferring military technology to civilian use.

I believe that some government assistance in technology development and transfer is needed. I also feel that we must form a better link between university research and practical applications of the technology. The Small Business Innovation Research (SBIR) program has been remarkably successful and the Small Business Technology Transfer (STTR) shows promise. During Fiscal Year 1992, the federal government spent \$15 billion on extramural research and development at the university level. Government's share to small business was a mere \$460 million. When small businesses account for 50 percent of all U.S. patents, it is obvious that we need to have universities working with industry to develop innovative technology.

It would be penny wise and pound foolish to neglect the financing needs of our small businesses at a time when our nation desperately needs the jobs and economic development small businesses generate. Thank you, again, Mr. Gibbons, for coming before us today to address the effects of future government policies on small businesses. I look forward to hearing your testimony.

STATEMENT OF THE HONORABLE MARILYN LLOYD
FOR THE RECORD
HOUSE SMALL BUSINESS COMMITTEE
MAY 13, 1993

I want to thank Chairman LaFalce for his foresight in holding today's hearing on the Administration's technology policy and on the Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) programs. I also appreciate the opportunity to submit testimony for the record. Last session, Congress achieved a major accomplishment in passing PL 102-564, which renewed and enhanced the SBIR program as well as created the pilot STTR program. This legislation was a direct result of the hard work of the Small Business Committee working with the Armed Services and Science, Space and Technology committees under the respective leadership of Representatives LaFalce, Skelton, Poshard, Aspin and Brown. Vice President Gore has also been an outspoken supporter of SBIR.

SBIR and STTR represent a unique opportunity to focus the attention of the nation's small businesses, scientists and engineers on development of new technologies and commercialization of the results. Hopefully the expansion of the SBIR and STTR programs provides the needed funding to advance the results of the highly successful SBIR program. The GAO reported to the Congress that SBIR is an example of a government program that is working, and testimony last year reported that SBIR and STTR could be the crown jewel of the federal government's research and development effort. These programs can focus ideas and concepts to develop solutions to some of the most critical technological problems of our time. We need to convey the message that expanding small businesses' role in research and development is a priority goal throughout the government.

It is obvious that we need leadership, support and cooperation from the Administration in implementing last year's legislation and making the revised SBIR program and the new STTR program a success. I hope the President's Science Advisor and the head of the Office of Science and Technology Policy will enlist the support of the Administration in directing the agencies to fully implement the revised programs in accordance with the law.

It has come to my attention that of the 5 agencies that are mandated to be part of the STTR program, only Defense and Energy are moving ahead expeditiously with implementing the program. We need the participation of NASA, NIH and NSF to strengthen and expand the programs. As Dr. Gibbons is aware, the three committees- Small Business, Science, Space and Technology and Armed Services- requested his support back in early March in making STTR a real keystone of the new Administration. Recently, I chaired a hearing on technology transfer in the Science Committee. One finding was that the Cooperative Research and Development (CRADA) mechanism is not working for small businesses. Allowing small companies to access the expertise and research

capabilities of our national labs should be a priority. This could be done through the STTR program or by using the SBIR award to fund part of a CRADA.

There are a number of other specific issues regarding the implementation of SBIR and STTR that I would like to explore. First, I would urge federal agencies other than the five mandated agencies to participate voluntarily in the STTR pilot program. As an example, maybe the FBI would like to use the small business community to develop advanced fingerprinting technology.

Second, it has been brought to my attention that the revised SBA policy directive for SBIR and STTR has taken a very narrow interpretation of the intent of the Congress in last year's legislation. The policy directive should allow federal agencies to collaborate in the SBIR and STTR programs; that is, they should allow one agency to fund Phase I and another agency to fund Phase II of a particular project. Review of this directive is needed both by the Administration and Congress.

Third, the concept of cost sharing with small businesses under the SBIR and the STTR program can prevent the smallest and most innovative new fledgling businesses from getting started. A rule that cost sharing is not to be required or considered in the evaluation of an SBIR or STTR proposal should be presented to the agencies for their review. Such a change could expand the scope of both programs and reach out to many businesses who otherwise could not take advantage of SBIR and STTR.

Fourth, some of the agencies are not providing adequate administrative funding for the SBIR and STTR programs, thereby denying both the manpower needed for effective administration. This situation should be remedied.

The Small Business Innovative Research and Small Business Technology Transfer programs can play a central role in this country's technology policy. We need the Administration's support to ensure that these important programs are implemented fully and effectively. Thank you again, Mr. Chairman, for this opportunity to express my support and concerns for these two programs.

Statement of John H. Gibbons
Director, Office of Science and Technology Policy

before the

Committee on Small Business
U.S. House of Representatives

May 13, 1993

THE ADMINISTRATION'S TECHNOLOGY POLICY AND SMALL BUSINESS

Mister Chairman, members of the Committee, thank you for this opportunity to testify on the Administration's technology policy and how it will help America's small businesses. The Administration recognizes the unique role that small business has to play in fostering new technologies, in creating new jobs, and in sustaining economic growth, and we are committed to working with small business to help them in that role.

According to the statistics, small businesses create most of the new jobs in this country. As a matter of fact, Bo Cutter on the National Economic Council is fond of pointing out that over the last few years, small business has created more than 100 percent of all the new jobs created in the private sector in this country. As many of our Fortune 500 companies undergo major restructuring and downsizing, it is all the more critical that the small business sector continues to grow.

Before discussing the Administration's technology policy, I thought I would put it in context. As you know, our technology policy is just one piece of the President's economic plan released in February. The plan includes a number of proposals designed to strengthen American companies—particularly small companies—and help them compete better in world markets. These include long-term investments that will pay dividends for years to come in terms of more and better jobs, a better educated workforce, and better health care. This bold plan addresses many of the key concerns of American business: (1) capital, (2) workforce training, (3) health care, (4) trade, (5) government regulation, and (6) technology.

(1) Capital. No business, large or small, can grow without access to patient capital. Unfortunately, in recent years, primarily due to the growing Federal deficit, it has been more and more difficult for companies, particularly small companies, to get the capital they need to invest in new equipment, worker training, and R&D. For that reason, the President has not only made reducing the deficit a top priority, he has provided a blueprint for doing so. His April budget would cut the deficit by \$447.5 billion over the next five years. Some of the cuts he has proposed will be painful, but they are essential if we are going to get the deficit under control and reduce interest rates. The Administration's commitment to deficit reduction has impressed world money markets and one result has been that interest rates have come down since November. That means lower mortgage payments for you and me and more money to invest for American business. And that translates into more jobs—and better jobs—in the future.

(2) Workforce training. As the President often notes, most Americans entering the workforce today will have more than half a dozen different jobs over the course of their career. In order to keep up with the rapid rate of technological change, workers will need retraining programs. The Administration's plan contains a number of proposals that will enable American workers to update their skills. We need to invest in people today so American business can compete tomorrow.

(3) Health care. The Administration has made reforming the health care system a top

priority because if we do not, health care costs for both the private sector and the Federal government will continue to soar. The rising cost of health insurance is a particular burden for small businesses, which usually must pay higher premiums than large companies. Health care costs account for about one-seventh of our GDP. And that figure is growing rapidly; this is an issue we cannot ignore.

(4) Trade. The Administration has already started to take action to open more foreign markets to American goods. U.S. companies make top-quality products, but that doesn't matter if foreign customers cannot buy them. That is why the Administration is working to conclude negotiations on NAFTA and the Uruguay Round of GATT. The Administration also plans to help American companies, particularly small- and medium-sized companies, to find overseas markets for their products. The Department of Commerce intends to expand its trade promotion programs and make them more effective. In recent years, exports have accounted for much of this country's economic growth. We intend to ensure that trend continues.

(5) Government regulation. Over the years, the regulatory burden on American business has grown steadily. This burden has fallen particularly hard on small business, which is least equipped to deal with it. As part of the National Performance Review being headed by Vice President Gore, we are looking at ways to make government work better and work smarter. Part of that means finding ways to eliminate unnecessary paperwork and regulations. The NPR report due September 7 will no doubt include proposals that could save American business and the government billions of dollars by eliminating the need to fill out and process unnecessary paperwork.

(6) Technology. According to Dr. Robert Solow, the Nobel Prize-winning economist from MIT, much of the economic growth in the U.S. since World War II is attributable to improvements in technology. New technologies generate new products and better ways of manufacturing. Breakthroughs such as the transistor, computers, recombinant DNA, and synthetic materials have created entire new industries and millions of high-paying jobs. The President made clear during the campaign that he understands the key role technology plays in economic growth and the key role government can play in helping industry develop and exploit new technologies. That is the reason more than 500 executives from high-tech companies, both large and small, endorsed candidate Clinton last September. Although most of them had traditionally voted Republican, they were willing to switch sides to support a candidate able to take the long view and work with industry to ensure that U.S. companies stay at the leading edge of technology.

I would now like to focus on the Administration's technology policy and discuss how it will help American companies, especially small businesses.

THE ADMINISTRATION'S TECHNOLOGY POLICY

As you know, on February 22, the President and the Vice President visited Silicon Valley and released a 36-page technology policy paper entitled "Technology for America's Economic Growth—A New Direction to Build Economic Strength." I have submitted copies of the paper with my testimony and additional copies are available from my office. This Technology Initiative provides a comprehensive strategy for using technology to meet a number of national goals. To quote the opening paragraph of the document:

Investing in technology is investing in America's future: a growing economy with more high-skill, high-wage jobs for American workers; a cleaner environment where energy efficiency increases profits and reduces pollution; a stronger, more competitive private sector able to maintain U.S. leadership in critical world markets; an educational system where every student is challenged; and an inspired scientific and technological research community focused on ensuring not just our national security but our very quality of life.

The Technology Initiative lays out three broad goals:

- (1) Long term economic growth that creates jobs and protects the environment.
- (2) A government that is more productive and more responsive to the needs of its citizens.
- (3) World leadership in basic science, mathematics, and engineering.

Small business has something to contribute in each of these three areas, but it is clear that it will be most involved in the first--sustaining economic growth--and for that reason I will focus on that part of the initiative. As I outline how we hope to meet this goal, I will provide a number of examples of particular programs that will help American small businesses develop and exploit technology to improve their bottom line.

The Administration intends to use technology as a catalyst for economic growth by:

- (1) direct support for the development, commercialization, and deployment of new technology.
- (2) fiscal and regulatory policies that indirectly promote these activities.
- (3) investment in education and training.
- (4) support for critical transportation and information infrastructure.

Technology Development, Commercialization, and Use

Compared to Japan and our other competitors, government support for civilian technology development has been minimal in the United States. Our focus has been on basic research and the development of technologies related to defense and space exploration, which

have only indirectly led to new technologies for the civilian sector.

That is no longer sufficient. In many high-tech fields, foreign companies have either matched or surpassed the best American companies. In many cases, most notably in Japan, they have done so by working closely with each other and with their government to accelerate the development and application of new technologies.

Technology Development. The Administration intends to dramatically increase funding for development of civilian and dual-use technologies over the next five years. Much of this new funding will go to small businesses, particularly start-up companies, which play a key role in developing and commercializing technologies. Small, start-up companies represent this country's biggest advantage when it comes to technology development. They are far more nimble and innovative than the large vertically-integrated conglomerates that dominate the high-tech sector in most developed countries.

Among the programs designed to strengthen industry-government cooperation and to provide more federal support for commercial R&D are:

- (1) The Commerce Department's Advanced Technology Program (ATP), which is slated to expand from \$68 million in FY93 to almost \$750 million by FY97. Created by Congress in 1990, the ATP provides competitive matching grants to companies working on "precompetitive" or "generic" technology. According to the Department of Commerce, during the first three years of the program, over 48% of all ATP grants and 24% of the funding went to businesses with less than 500 employees. In addition, 30% of the grants and 50% of the funding was awarded to joint ventures, many of which included small businesses.
- (2) The Defense Advanced Research Projects Agency (DARPA) has been renamed the Advanced Research Projects Agency (ARPA) and will devote more of its resources to dual-use technologies with both defense and civilian applications.
- (3) The Technology Reinvestment Project created by Congress last year will provide over \$500 million to ARPA, NASA, the Commerce Department, the Energy Department, and the National Science Foundation to fund innovative technology development projects at companies--large and small--throughout the country. This program is particularly focussed on helping defense contractors and subcontractors redirect their resources toward developing civilian technologies. In addition, it will create technology extension programs to help small- and medium-sized companies throughout the country.
- (4) Federal laboratories run by the Department of Energy, NASA, and other agencies will devote a growing percentage of their budget to R&D partnerships with industry. These partnerships will be designed and partially funded by industry in order to ensure that they lead to technology that will be utilized to develop new products and

processes.

- (5) Expand the Small Business Innovation Research (SBIR) Program. As you know, Vice President Gore, when he was a House member, played a key role in creating the SBIR program and continues to be a champion for it. Last fall, he and the President endorsed the doubling of the SBIR set-aside from 1.25% to 2.5%, and shortly before it adjourned in October, Congress passed and President Bush signed legislation for that purpose. The SBIR program has been a real success, helping hundreds of small companies throughout the country take good ideas and turn them into new technologies and new products.
- (6) The Small Business Technology Transfer (STTR) Program created last year by this Committee will augment the SBIR Program by setting aside approximately \$24 million in FY94 for grants that would enable small businesses to work with universities and Federal laboratories to move promising technologies out of the lab and into the marketplace. The five agencies involved in the program—the National Science Foundation, NASA, and the Departments of Defense, Energy, and Health and Human Services—are in the process of implementing this program. The legislation provides considerable flexibility and the various agencies are exploring different ways to structure the program.

Commercialization and Use. The Technology Initiative includes a number of different programs to accelerate the commercialization and use of new technologies. Of particular interest to the small business community are:

- (1) Regional Technology Alliances, funded by the Defense Department, to promote the commercialization and application of critical technologies by bringing together firms and research institutions in a particular region to exchange information, share and develop technology, and develop new products and markets. Such alliances will be particularly helpful to small companies which lack the technological breadth of larger companies.
- (2) Manufacturing Extension Centers. Existing state and federal manufacturing extension centers managed through the Department of Commerce help small- and medium-sized businesses evaluate and adopt new, advanced manufacturing methods and technology. These extension centers work in much the same way as the U.S. agricultural extension programs. To date the Commerce Department has been able to fund only seven Manufacturing Technology Centers, which can reach only a small fraction of the firms that could benefit from their testing facilities and training programs. However, almost \$90 million in FY93 funding was provided to support these types of programs as part of the defense conversion program established by Congress last year. The Administration is committed to building upon these programs and plans to work with state and local governments and universities to create a national network of over 100 extension centers.

Fiscal and regulatory policies that promote innovation and private sector investment

While Federal technology programs are important, they cannot succeed unless they are coupled with government policies that encourage American businesses to develop and apply new technologies. Unfortunately, many of our current fiscal and regulatory policies stymie rather than encourage investment in new technologies and new products. The Administration intends to change that by:

- (1) Making the Research and Experimentation (R&E) Tax Credit permanent. In the past, the effectiveness of this credit has been undermined because it has been extended only six or nine months at a time. This means that companies cannot accurately project the real costs of a given R&D project. Research and development, by its nature, requires long-term investment and businesses, particularly small businesses, will be reluctant to make such commitments without a permanent R&E tax credit.
- (2) Reforming procurement policies to encourage the Federal government to purchase new products rather than using those based on yesterday's technologies. In many areas, Federal procurement regulations make it difficult for agencies to buy the most modern equipment and supplies. Because specifications are often written with existing products in mind, agencies cannot purchase a newer, superior product. This is particularly true for computer and communications equipment. As part of the National Performance Review, the Administration is looking at ways to be a better customer and thus encourage American industry to develop and market new technologies.
- (3) Patient capital. There are recurring concerns about the lack of patient capital for investment in new technologies. Partly in response to those concerns, last year the Congress passed legislation to restructure the Small Business Investment Company (SBIC) Program. The Administration is implementing that legislation and is exploring a number of other ways to provide low-cost capital to enable both large and small companies to invest in new technologies. H.R. 820, the National Competitiveness Act, includes provisions for loan guarantees and a Federal venture capital fund. The National Academy of Sciences has proposed creating a publicly-funded, privately-run Civilian Technology Corporation. The private-sector Council on Competitiveness recently proposed a sweeping set of reforms to encourage long-term corporate investment. All these proposals and others are presently being carefully considered by a multi-agency group working under the aegis of the National Economic Council.

Education and Training

Any businessperson will tell you their company's most important resource is their people. Productivity and profits depend upon having well-educated, well-trained employees. For that reason, the Administration is committed to helping all Americans have access to a world-class education and worker training programs.

Technology has a key role to play in this area. Computer software, computer networks, and distance learning are just a few of the tools that are being used to improve education and training. Unfortunately, many companies, especially small companies, have not been able to take advantage of these technologies. The Clinton Administration feels that the Federal government needs to do more with the development and application of cost effective technologies. For that reason, we intend to:

- (1) Expand access to the Internet computer network to connect more universities, community colleges, and high schools to each other and to a broad range of information resources. This will enable teachers at one college to teach courses at schools and colleges throughout the country. In addition, companies that connect to the Internet will be able to take advantage of education and training programs offered over the Internet as well. They will also be able to locate and use training software for their in-house training programs.
- (2) Create an interagency task force to (i) establish software and communications standards for education and training, (ii) coordinate the development of critical software elements, (iii) support innovative software packages and (iv) collect information resources in a standardized format and make them available to schools and teaching centers through the nation using communications networks.
- (3) Transfer some of the education and training technology developed by the military to the civilian sector so that it can be used in our schools, factories, and offices. Last year, the Navy Training Systems Center and the Army Simulation, Training, and Instrumentation Command together spent about \$1 billion on training systems. The same technology they have developed to train engine mechanics could be used to train factory workers as well.

Information Infrastructure

During the campaign, the President repeatedly emphasized the need to improve this country's infrastructure. Today, that means not only roads and bridges and airports, but also high-speed telecommunications networks and computer systems that form a "National Information Infrastructure". This National Information Infrastructure will soon provide almost all Americans with access to unprecedented amounts of information, when they want it, where they want it. Using fiber-optic networks, wireless communications, and other technologies, this infrastructure will transmit two-way video as easily as the phone system carries voice and fax today. We will have access to thousands of movies or channels of HDTV programming, video-conferencing at our desks, and the ability to retrieve huge volumes of electronic information from "digital libraries" connected to the network.

This infrastructure will enable dramatic improvements in education, health care, education, entertainment, and other sectors of the economy. For instance, using advanced networking technology, a doctor who needs a second opinion could transmit a patient's entire

medical record—x-rays and ultrasound scans included—to a colleague thousands of miles away, in less time than it takes to send a fax today. A school child in a small town could come home and through a personal computer, reach into an electronic Library of Congress—thousands of books, records, videos, and photographs, all stored electronically.

Without this information infrastructure, American business, especially for small business, will find it hard to compete in the 21st Century. Other countries are moving ahead aggressively to deploy high-speed telecommunications networks. Our companies need to have faster, better access to information, which will enable them to make higher-quality products and provide superior service. Development of a national, public network is particularly important for small businesses, which unlike many Fortune 500 corporations, do not run their own private networks. As high-speed networks are deployed, small businesses will be able to use them to collaborate with other companies, both large and small, as part of "virtual corporations" in order to provide products and services that no one company could provide. Thus, the information infrastructure will create more opportunities for small businesses to compete with large companies and with their foreign competitors.

The information infrastructure will, for the most part be built and run by the private sector. But the government has a key role to play in: (1) working with industry to develop and demonstrate the technology needed for the information infrastructure and (2) formulating forward-looking telecommunications and information policies that promote competition and investment while ensuring that the information infrastructure benefits all Americans.

The Administration has made a number of proposals to do this, including:

- (1) The High-Performance Computing and Communications Program established by the High-Performance Computing Act of 1991. Research and development funded by this program is creating (1) more powerful supercomputers, (2) faster computer networks, and (3) more sophisticated software, needed to build the National Information Infrastructure. The Congress appropriated almost \$803 million in funding for FY93 and the Administration is requesting a total of \$1.000 billion for FY94.)
- (2) An Information Infrastructure Technology and Applications Program to develop the hardware and software needed to fully apply advanced computing and networking technology in manufacturing, in health care, in life-long learning, and in libraries. This multi-agency program will involve the National Science Foundation, NASA, the National Institutes of Health, the National Institute of Standards and Technology, and other agencies. (The Administration requested \$96 million for FY94 for this effort.)
- (3) Networking pilot projects through the National Telecommunications and Information Administration (NTIA) of the Department of Commerce. NTIA's Public Telecommunications Facilities Program will provide matching grants to states, school districts, libraries, and other non-profit entities so that they can purchase the computers and networking connections needed for distance education and for hooking

into computer networks like the Internet. These pilot projects will demonstrate the benefits of networking to the educational and library communities. (The Administration has requested \$51 million for FY94.)

- (4) Promote dissemination of Federal information. Every year, the Federal government spends billions of dollars collecting and processing information (e.g. economic data, environmental data, and technical information). Unfortunately, while much of this information is very valuable, many potential users either do not know that it exists or do not know how to access it. The Clinton Administration is committed to using new computer and networking technology to make this information more available to the taxpayers who paid for it. This will require upgrading computer systems at dozens of Federal agencies as well as at the Government Printing Office and the National Technical Information Service, which have key roles in disseminating government information. In addition, it will develop consistent Federal information policies designed to ensure that Federal information is made available at a fair price to as many users as possible.
- (5) Reforming Telecommunications Policy. Government telecommunication policy has struggled to keep pace with new developments in telecommunications and computer technology. As a result, government regulations have tended to inhibit competition and delay deployment of new technology. Without a consistent, stable regulatory environment, the private sector will be hesitant to invest the hundreds of billions of dollars needed to build the high-speed national telecommunications network that this country needs to compete successfully in the 21st Century. To create a consistent Federal telecommunications policy, the Clinton Administration will create a high-level inter-agency White House task force which will work with Congress and the private sector to find consensus on issues like the Modified Final Judgment, spectrum reallocation, the cable television regulation, and the evolution of the Internet.

CONCLUSION

As you can see, the Administration has a comprehensive, pro-active technology policy that will provide huge benefits to American business--especially small business. And by doing so, it will provide huge benefits to all Americans--in terms of new, high-paying jobs, a cleaner environment, and a higher quality of life for all of us and our children.

I look forward to working with this Committee to ensure that our technology programs meet the needs of small business. Particularly in the area of technology, small business men and women have a key role to play. They are the innovators and the risk takers. Without them and without government policies that encourage them, we cannot hope to meet the ambitious goals we have set.

Thank you again for this opportunity to testify. I would be happy to answer any questions.

TYPICAL CITY AGENDA

30 min	Opening Remarks By Cities/States
1hr 30 min	Technology Reinvestment Overview - Project Description - Common Concepts - How to Propose - Q&A
15 min	Break
1hr 30 min	Breakout Sessions - Breakout A: Technology Development, SBIR - Breakout B: Technology Deployment - Breakout C: Manufacturing Education and Training



Regional Meetings

DATE	LOCATION	ATTENDANCE*
April 12	New York City	1,000
April 13	Detroit	800
April 14	Orlando	800
April 15	Dallas	800
April 16	Los Angeles	1,400

Hosted by Regional Governors' Associations with participation of local Chambers of Commerce

*approximate



City Meetings

DATE	LOCATION	ATTENDANCE*
April 23	St. Louis	250
April 26	Boston	520
April 29	Albuquerque	140
May 3	Hartford	200
May 7	Denver	100
May 10	Seattle	125
May 10	New Hampshire	120
May 12	Philadelphia	150
May 12	San Jose	250
May 12	Madison	100
May 12	Little Rock	75
May 13	Ann Arbor	100
May 14	Oakland	500
May 24	Utica	120

*approximate

BOSTON PUBLIC LIBRARY



3 9999 05983 534 6

ISBN 0-16-041567-5

